

**A COST EFFECTIVE APPROACH TO TAXONOMIC RESOLUTION  
FOR BIOASSESSMENT AND MONITORING PROGRAMS IN THE STATE OF GEORGIA**

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Columbus State University  
The College of Science  
The Graduate Program in Environmental Science

A cost effective approach to taxonomic resolution  
for bioassessment and monitoring programs in the State of Georgia

A Thesis in  
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by  
Jodi Alene Williams

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## ABSTRACT

The Georgia Ecoregions Reference Sites Project has developed biological criteria for streams in Georgia according to the *Rapid Bioassessment Protocols For Wadeable Streams and Rivers*. Streams will ultimately be classified into categories of impairment so that management decisions can be made in accordance with the Clean Water Act. A cost-effective approach to accomplish mandates set forth by the Clean Water Act must be employed, as state budgets are limited. One means of examining costs is to assess taxonomic resolution. Taxonomic resolution not only assesses the sensitivity of biocriteria, it also allows one to make recommendations to state agencies regarding the costs and benefits of recommended taxonomic identification requirements. Due to the broad diversity in geology, topography, climate, soils and geography within Georgia, taxonomic resolution requirements may vary. Thirty macroinvertebrate samples from five reference condition streams and five or six impaired streams from three Georgia sub-ecoregions were identified to "lowest possible" or lowest practical level. Lowest practical level includes many taxonomic levels determined by the group identified and the availability of peer-reviewed keys. Specific data from lowest practical level were reduced to generic level then further reduced to familial level so that three identification levels, incorporated into sub-ecoregional specific invertebrate indices, were assessed for discriminatory ability. Time spent on identification was recorded at each taxonomic level so that identification "costs" versus "benefits" or degree of information could be used in conjunction with the indices in determining recommended taxonomic resolution requirements. Final analysis indicated taxonomic resolution requirements vary among subecoregions within Georgia and future benthic work, at least in some subecoregions, will require less time and money. By performing cost/benefit analyses, agencies involved in bioassessment and biomonitoring programs can identify regions that may require less taxonomic effort.



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## INTRODUCTION.

Water is an essential resource for life and with human populations continually expanding our water resources are becoming depleted. In fact, in some geographical areas, current usage exceeds long-term availability. Furthermore, water that is available is quickly becoming degraded by anthropogenic activities. Water resources must be managed at local, regional, national and global levels to ensure future supplies. Human society is a living system that depends on other living systems for its success; therefore, managing water resources must include the protection of aquatic ecosystems. "The decline in the distribution, abundance, and quality of water and aquatic ecosystems thus represents a threat to the sustainability of all living systems and the quality and long-term viability of human society" (Karr 1995). As Norman Myers (1993) stated, "Our future will be deeply compromised unless we learn to manage water as a critical ingredient of our lives."

To establish goals for the restoration and protection of freshwater ecosystems in the United States, Congress passed the 1972 Clean Water Act (CWA) (33 U.S.C. § *et seq.*) which mandates the improvement of stream conditions in each state. The objective of the act is "to restore and maintain the chemical, physical and biological integrity of the nation's waters." (Clean Water Act, §101(a), 33 U.S.C., 1251(a), 1999). Biological integrity, as defined by Karr and Dudley (1981), is the ability of an aquatic ecosystem, to support and maintain a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of



the natural habitats of a region. Therefore, individual states, as required by the United States Environmental Protection Agency (EPA) and in compliance with Section 319 of the Clean Water Act (Clean Water Act §319, 33 U.S.C., §1329, 1999) must develop biological criteria (biocriteria), based on biological assessment (bioassessment), and implement these biocriteria into State Water Quality Standards so that impacted waters are identified and evaluated for nonpoint sources of pollution (NPS). Bioassessments provide an integrated assessment of water quality when combined with measurements of chemistry and habitat because they directly measure biologic integrity and indirectly measure physical and chemical integrity. The EPA has published guidelines on developing bioassessment systems for use by states, called the Rapid Bioassessment Protocols (RBP's) (Barbour *et al.* 1999) and for biocriteria (Gibson *et al.* 1996).

Traditionally, water quality assessment has been performed almost exclusively by chemical analysis. More recently however, water quality has included the assessment of ecological integrity by using indicator organisms such as fish, periphyton or macroinvertebrates. Benthic macroinvertebrates, those large invertebrates that inhabit the bottom substrates, are often used in bioassessments as indicators of water quality because they offer many advantages. First, they are ubiquitous and therefore are affected by perturbations that occur in different types of habitats within the water (Lenat *et al.*



1980). Second, the large number of benthic species typically collected from a sample can provide a full range of responses to stress (Hellawell 1986, Abel 1989). Third, their sedentary nature allows for spatial analysis of pollutant or disturbance effects (Slack *et al.*, 1973, Hawkes 1979, Penny 1985, Hellawell 1986, Abel 1989). Finally, the life cycles of macroinvertebrates are long in comparison to other groups, allowing for elucidation of temporal changes caused by perturbations (Gaufrin 1973, Slack *et al.* 1973, Weber 1973, Lenat *et al.* 1980, Penny 1985, Hellawell 1986, Abel 1989). As a result, benthic macroinvertebrates are continuous monitors of the water they inhabit (Hawkes 1979). Thus, they more accurately reflect chronic conditions than might be indicated by more mobile fish species or short-lived periphyton.

Qualitative approaches using benthic macroinvertebrate assemblages, such as rapid assessment approaches, have recently been accepted as a means to identify water quality problems due to point and non-point source pollution, and to document long-term regional changes in water quality (Barbour *et al.* 1999). Rapid assessments reduce effort and associated costs in evaluating a site in relation to quantitative techniques by (1) reducing the number of habitats sampled and replicate sample units taken per habitat; (2) collecting less silt and particulate matter making sorting faster and easier; (3) considering only a fraction of the animals collected thus reducing time spent on identification; and (4) identifying organisms to family or higher taxonomic levels. Rapid assessment



approaches can also provide summary information of study sites in a way that can be understood by non-specialists such as managers, the general public and decision-makers (Resh and Jackson 1993). This form of water quality analysis is accomplished by expressing analytical measures (metrics) as single scores and then placing the scores in categories of varying water quality based on regional background data. The EPA's Rapid Bioassessment Protocols (RBP), although not strictly qualitative, is one method that is frequently employed because elements of both qualitative and quantitative approaches are working in conjunction so that results are achieved in a timely manner.

Although rapid bioassessments are efficient, not all bioassessment protocols allow for identification of organisms to family or higher taxonomic levels. There is considerable debate as to the taxonomic resolution of macroinvertebrates necessary to accurately determine community condition in bioassessments. Resh and Unzicker (1975) have demonstrated that component species for 61 of the 89 genera for which water-quality tolerances have been established fall into different tolerance categories. They stress the importance of species level or "lowest practical level" due to the substantial variation among species within genera and families and their different responses when exposed to various kinds of pollution. Hawkins *et al.* (2000) concluded that, in taxonomically rich areas, it was necessary to identify to the genus or species



level in order to explain variation among communities, but in areas of little taxonomic diversity they found that family level was sufficient.

Although a diverse benthic fauna in streams suggests the need for generic or specific levels of identification, it has not been determined whether the aquatic ecosystems in taxonomically rich regions respond to stressors more consistently at the genus or species level than at the family level. Greater variation in species from site to site may reduce the ability to detect a deviation from the unimpaired or minimally impaired stream (*i.e.*, the reference condition), and information gained from the genus level may represent ecological noise depending on the specificity of the benthic community's response to stress (Bailey *et al.* 2001). In addition, species-level identification is not always possible because immature stages are collected and species designations are based on the morphological characteristics of adult insects or larval-adult associations (Lenat and Resh 2001). The lack of complete knowledge of each species' environmental requirements may result in arbitrarily assigning existing knowledge that has been derived at the generic or familial level resulting in similar summary information when the different taxonomic levels are compared (Lenat and Resh 2001).

With varying taxonomic resolution, Bowman and Bailey (1997) found little effect on multivariate descriptions of variation among communities, particularly when comparing reference sites to impaired sites. They argued that sufficient



resolution for sensitive and accurate bioassessments is achieved when organisms are identified to family level or higher.

To be effective in evaluation of stream impairment, organisms identified to genus or species level must provide significantly more descriptive information than family level, and they must enable better detection of departure from reference condition or the resources expended on taxonomic identification will not be cost effective (Bailey *et al.*, 2001).

As the RBP continues to increase in application across the United States, it will become necessary to resolve the issue of taxonomic resolution, not only to assess the sensitivity of the assessment, but also to make recommendations to state agencies regarding the costs and benefits of recommended identification levels.

The purpose of this research was to determine if departure of macroinvertebrate metric scores from the reference condition was easier to detect with generic or specific identifications than identification to family level.

The results presented here were part of the third phase of the Georgia Ecoregions Reference Sites Project conducted for the Georgia Department of Natural Resources (GA DNR) by Columbus State University (CSU) as described in the quality assurance program plan (Columbus State University 2000). The project was performed in four phases. Phase I of the project delineated Georgia ecoregions and subcoregions and selected reference sites. Phase II focused



on the physical, chemical and biological characterization of reference stream conditions. As part of the biological component of reference stream characterization, the structure of the benthic macroinvertebrate community was broken into a group of metrics and candidate invertebrate indices were developed for each subcoregion (Hughes 2004). Phase III applied the indices to impaired streams as a means to develop a numerical classification system whereas Phase IV categorized stream impairment. The subcoregional invertebrate indices developed for Phase II were the means by which I assessed taxonomic variability.



## METHODS.

Bioassessment of aquatic ecosystems using benthic macroinvertebrates involves sampling the community at each of a set of sites and then comparing the community structure and composition at a test site with a reference site or reference condition (Reynoldson *et al.* 1997).

Benthic macroinvertebrates used in this study were collected using the multi-habitat approach or 20-jab method according to the Rapid Bioassessment Protocols For Use in Streams and Wadeable Rivers (Barbour *et al.*, 1999) for Phase II and Phase III of the Georgia Ecoregions Reference Sites Project. Systematically, samples were collected from different types of habitat within a representative portion of the stream (100-meter reach). By kicking the substrate and jabbing with a D-frame dip net, a total of twenty jabs were taken from different habitat types proportionate to their representation of total habitat in the reach and combined to obtain a single homogenous sample. Samples were transferred from the net to 1-Liter plastic storage containers, properly labeled internally and externally, preserved with 95% ethanol and transported to CSU where they were stored. Each container was assigned a serial log number that was recorded in a field notebook and on chain-of-custody forms to indicate the person responsible for the samples. When the samples were delivered to the CSU laboratory, the lab manager assumed custody (Columbus State University 2000).

In addition to the biological samples collected, chemical and physical data were measured and recorded in the field for use in characterizing reference



conditions. *In situ* chemical data such as pH, dissolved oxygen (DO), turbidity, and conductivity were obtained by using a Hydrolab H200 Water Quality Multiprobe/Scout® 2 Display Unit (Columbus State University 2000). Water temperature and depth was also measured with the Hydrolab H200. Physical data measured included visual habitat assessment, characterization of general land use, description of stream origin and type, and summary of riparian vegetation, substrate, and stream morphology (Barbour *et al.* 1999).

In the lab, samples were processed and subsampled based on a fixed-count (200 organisms) approach and macroinvertebrates were identified to the lowest practical level using compound microscopes and peer-reviewed taxonomic references (Appendix B) as stipulated in the Phase III QAPP (Columbus State University 2001).

Before identification, chironomid larvae were mounted on slides in CMCP-10, a highly viscous mounting and clearing agent and stored in slide cases. All other specimens were stored in vials of denatured 70% ethanol and tightly capped. Each vial had an interior label and an exterior stick-on label indicating sample location, sample identifier and date. For each sample, bench sheets were used to record cumulative count of taxon, life stages, and time spent on taxonomic resolution. Any difficulties encountered during identification (e.g., missing gills or no species key available) were noted on the bench sheets. A Taxonomic Certainty Rating (TCR), ranging from one to five, (used as a measure of confidence) with the lowest value (1) representing greatest confidence in



identification, was also recorded on the bench sheets. TCR's of three or greater were accompanied by an explanation.

Biological samples, each containing about 200 individuals, were collected from 31 sites, identified, and evaluated for taxonomic resolution. To represent a spectrum of the diversity in underlying geology and geography of the state, which ultimately affects aquatic biological communities, ten samples from the Blue-ridge Mountain Ecoregion and the Piedmont Ecoregion and eleven samples from the Southeastern Plains Ecoregion were examined. Because recent drought conditions affected the number of streams that could be sampled in some regions of the state, specific subcoregions, having at least ten sampled sites, were chosen for this study to ensure timely analysis. The subcoregions selected were the Southern Metasedimentary Mountains (66g), the Southern Inner Piedmont (45a), and the Sand Hills (65c). Locations of the thirty-one catchments sampled for this study are depicted on the maps in Appendix A. Five of the total catchments sampled from each subcoregion represented reference condition and five or six catchments sampled, depending on the subcoregion, had some degree of impairment as defined by Gore *et al.* (2004).

Georgia's six ecoregions and twenty-eight subcoregions are depicted in Figure 1.



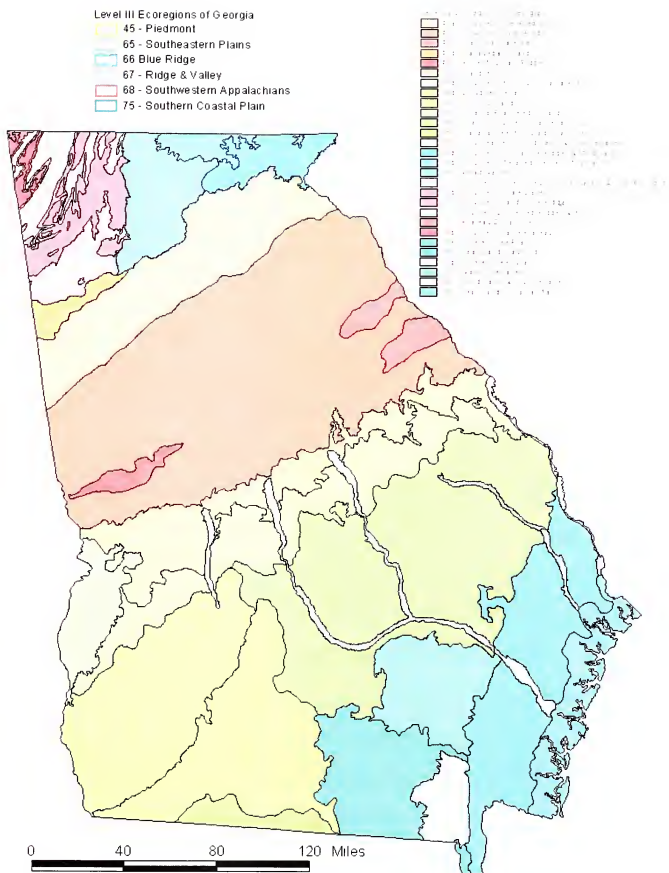


Figure 1. Level III and IV Ecoregions of Georgia (Griffith *et al.* 2001).



Candidate benthic metrics (Table 1) were used for characterizing each reference stream. These metrics were standardized on a 100-point scale and evaluated for discrimination potential. The metrics with the highest discrimination efficiency (DE) were compiled into ecoregional and subcoregional indices (Hughes 2004) and recommended as being the best indices for differentiating impaired and reference conditions (Gore *et al.* 2004).

Metrics incorporated into the subcoregional indices were used to evaluate taxonomic resolution at the lowest practical level (LPL), at the generic level, and at the familial level. When compiling invertebrate indices the metrics that did not apply at the generic and familial identification levels were considered non-valid and were omitted from the index. Index discrimination efficiencies were computed by using the 25<sup>th</sup> percentile of reference condition scores. A 25<sup>th</sup> percentile is considered sufficiently conservative to protect aquatic resources and still allow for some uncertainty of reference condition sites (Jessup and Gerritsen 2000). The 25<sup>th</sup> percentile of reference condition scores is used as a threshold value for management action since impairment measurements, as an index score, fall along a continuum. A threshold reflects the risk and uncertainty of misclassification of stream health: the risk of declaring a good stream as impaired (Type-I error) and the risk of declaring an impaired stream good (Type-II error) (Jessup and Gerritsen 2000). Box and whisker plots were used to exhibit distribution of reference condition and impaired index scores and for evaluating taxonomic resolution requirements.



Table 1. Candidate benthic metrics and predicted direction of metric response to increasing perturbation (Hughes 2004).

| METRIC                | STRESS RESPONSE | SOURCE                                                   | NOTES |
|-----------------------|-----------------|----------------------------------------------------------|-------|
| Total Taxa            | Decrease        | Barbour <i>et al.</i> 1999                               |       |
| EPT Taxa              | Decrease        | Barbour <i>et al.</i> 1999                               |       |
| Ephemeroptera Taxa    | Decrease        | Barbour <i>et al.</i> 1999                               |       |
| Plecoptera Taxa       | Decrease        | Barbour <i>et al.</i> 1999                               |       |
| Trichoptera Taxa      | Decrease        | Barbour <i>et al.</i> 1999                               |       |
| Coleoptera Taxa       | Decrease        | Barbour <i>et al.</i> 1996                               |       |
| Diptera Taxa          | Decrease        | Barbour <i>et al.</i> 1999                               |       |
| Chironomidae Taxa     | Decrease        | Barbour <i>et al.</i> 1999                               |       |
| Tanytarsini Taxa      | Decrease        | Barbour <i>et al.</i> 1996                               |       |
| Evenness              | Decrease        | general literature (Barbour <i>et al.</i> 1999)          |       |
| Margalef Index        | Decrease        | general literature (Barbour <i>et al.</i> 1999)          |       |
| Shannon-Wiener base e | Decrease        | Stribling <i>et al.</i> 2000/ Barbour <i>et al.</i> 1996 |       |
| Simpson's Diversity   | Increase        | Stribling <i>et al.</i> 2000                             |       |
| EPT Pct               | Decrease        | Barbour <i>et al.</i> 1999                               |       |
| Ephemeroptera Pct     | Decrease        | Barbour <i>et al.</i> 1999                               |       |
| Amphipoda Pct         | Decrease        | Barbour <i>et al.</i> 1996                               |       |
| Bival Pct             | UNKNOWN         | UNKNOWN                                                  |       |
| Chironomidae Pct      | Increase        | Barbour <i>et al.</i> 1999                               |       |
| Coleoptera Pct        | Decrease        | Barbour <i>et al.</i> 1996                               |       |
| Diptera Pct           | Increase        | Barbour <i>et al.</i> 1999                               |       |
| Gastropoda Pct        | Decrease        | Barbour <i>et al.</i> 1996                               |       |
| Isopoda Pct           | Increase        | Barbour <i>et al.</i> 1996                               |       |
| NonInsect Pct         | Increase        | Barbour <i>et al.</i> 1999                               |       |
| Odonata Pct           | Increase        | Barbour <i>et al.</i> 1996                               |       |
| Plecoptera Pct        | Decrease        | Barbour <i>et al.</i> 1999                               |       |



Table 1. cont.

|                                           |                   |                                                    |                                        |
|-------------------------------------------|-------------------|----------------------------------------------------|----------------------------------------|
| Tanytarsini Pct                           | Decrease          | Barbour <i>et al.</i> 1999                         | WV & Rockdale also say increase        |
| Oligochaeta Pct                           | Variable/Increase | Barbour <i>et al.</i> 1999/Geritsen and Leppo 2000 |                                        |
| Trichoptera Pct                           | Decrease          | Barbour <i>et al.</i> 1999                         | RBP Subfamily Tolerance Value          |
| %Chironominae/TC                          | Variable          | Barbour <i>et al.</i> 1999                         | RBP Subfamily Tolerance Value          |
| %Orthoclaudiinae/TC                       | Decrease          | Barbour <i>et al.</i> 1999                         | RBP Subfamily Tolerance Value          |
| %Tanypodinae/TC                           | Increase          | Barbour <i>et al.</i> 1999                         |                                        |
| Hydropsychidae/Trichoptera                | Increase          | Barbour <i>et al.</i> 1999                         | Inferred/RBP                           |
| Hydropsychidae/EPT                        | Increase          | Barbour <i>et al.</i> 1999                         | Inferred/RBP                           |
| Tanytarsini/TC                            | Decrease          | Barbour <i>et al.</i> 1999                         |                                        |
| Baetidae/Ephemeroptera                    | UNKNOWN           | UNKNOWN                                            |                                        |
| <i>Cricotopus</i> & <i>Chironomus</i> /TC | Increase          | Barbour <i>et al.</i> 1999                         | RBP Genera Tolerance Values            |
| Tolerant Taxa                             | Increase          | Barbour <i>et al.</i> 1999                         | Inferred/RBP                           |
| Tolerant Pct                              | Increase          | Barbour <i>et al.</i> 1999                         |                                        |
| Intolerant Taxa                           | Decrease          | Barbour <i>et al.</i> 1999                         |                                        |
| Intolerant Pct                            | Decrease          | Barbour <i>et al.</i> 1999                         | Inferred/RBP                           |
| Dominant01 Pct                            | Increase          | Barbour <i>et al.</i> 1999                         |                                        |
| Dominant01 Individuals                    | Increase          | Barbour <i>et al.</i> 1999                         |                                        |
| BeckBI                                    | Decrease          | Barbour <i>et al.</i> 1999                         | Inferred/RBP (Florida index increases) |
| HBI                                       | Increase          | Barbour <i>et al.</i> 1999                         |                                        |
| NCBI                                      | Increase          | Lenat 1993                                         |                                        |
| Scraper Pct                               | Decrease          | Barbour <i>et al.</i> 1999                         |                                        |



Table 1. cont.

|                |                   |                                                      |                                               |
|----------------|-------------------|------------------------------------------------------|-----------------------------------------------|
| Scaper Taxa    | Decrease          | Gerritsen and Leppo 2000                             | WV also says decrease                         |
| Collector Pct  | Decrease          | Gerritsen and Leppo 2000                             |                                               |
| Collector Taxa | Decrease          | Gerritsen and Leppo 2000                             |                                               |
| Predator Pct   | Variable/Decrease | Barbour <i>et al.</i> 1999/ Gerritsen and Leppo 2000 | WV also says decrease                         |
| Predator Taxa  | Decrease          | Gerritsen and Leppo 2000                             |                                               |
| Shredder Pct   | Decrease          | Barbour <i>et al.</i> 1999                           |                                               |
| Shredder Taxa  | Decrease          | Stribling <i>et al.</i> 2000                         |                                               |
| Filter Pct     | Variable/Increase | Barbour <i>et al.</i> 1999/Gerritsen and Leppo 2000  | WV also says increase                         |
| Filter Taxa    | Decrease          | Barbour <i>et al.</i> 1999                           | Inferred/RBP (all # of taxa metrics decrease) |
| ClingerTaxa    | Decrease          | Barbour <i>et al.</i> 1999                           |                                               |
| Clinger Pct    | Decrease          | Barbour <i>et al.</i> 1999                           |                                               |
| Burrower Taxa  | Decrease          | Barbour <i>et al.</i> 1999                           | Inferred/RBP                                  |
| Burrower Pct   | UNKNOWN           | UNKNOWN                                              |                                               |
| Climber Taxa   | Decrease          | Barbour <i>et al.</i> 1999                           | Inferred/RBP                                  |
| Climber Pct    | UNKNOWN           | UNKNOWN                                              |                                               |
| Sprawler Taxa  | Decrease          | Barbour <i>et al.</i> 1999                           | Inferred/RBP                                  |
| Sprawler Pct   | UNKNOWN           | UNKNOWN                                              |                                               |
| Swimmer Taxa   | Decrease          | Barbour <i>et al.</i> 1999                           | Inferred/RBP                                  |
| Swimmer Pct    | UNKNOWN           | UNKNOWN                                              |                                               |



To perform cost/benefit analyses, a stopwatch was used to time taxonomic resolution for twelve samples. Times recorded were standardized and averaged so that total time spent on identification at each taxonomic level and total time spent on mounting chironomid larvae within each subcoregion represented "costs". Costs versus "benefits," degree of information reflected by high discrimination efficiencies, were compared at each taxonomic level. The level of taxonomy exhibiting the greatest discriminatory efficiency between reference and impaired sites within the subcoregions was determined to be the most economical means for accurately classifying stream water quality.



## **RESULTS.**

### **Taxonomic Resolution**

Thirty-one biological samples from five reference sites and five or six impaired sites from three subcoregions were collected during the index period September through February of 2000, 2001 and 2002. Of the 6,782 macroinvertebrates identified 427 were identified to family level; 3,613 to genus level; 2,557 to species level, and 185 to subfamily, class or tribe (See Appendix B).

Metrics included within the subcoregional-specific invertebrate indices exhibited greater discrimination efficiency at different levels of taxonomic resolution (Table 2).

Metric discrimination efficiencies of the indices for the Southern Inner Piedmont, the Southern Metasedimentary Mountains, and the Sand Hills subcoregions were similar for the most part; however, within the index for the Southern Inner Piedmont (45a), burrower taxa had 0% discrimination efficiency at generic identification and 40% discrimination efficiency at both the family and lowest practical levels of identification. Discrimination efficiency for Ephemeroptera, Plecoptera, Trichoptera (EPT) taxa metric was 20% greater at family identification than it was for both generic and LPL identifications and discrimination efficiency for percent tolerant taxa was 60% less than discrimination efficiencies for the same metric at the lowest practical and generic identification levels. Percent scraper had 20% greater discrimination efficiency at identification to LPL than it did to the genus and family identifications.



Table 2. Metric categories, metrics compiled into invertebrate indices (Hughes 2004) and metric discrimination efficiencies (DE's) for three levels of taxonomy for three subcoregions.

| Southern Inner Piedmont            |                                           | LPL  | Genus | Family |
|------------------------------------|-------------------------------------------|------|-------|--------|
| Metric Category                    | Metric                                    | D.E. | D.E.  | D.E.   |
| Richness                           | EPT Taxa                                  | 60%  | 60%   | 80%    |
| Composition                        | Chironomidae Percent                      | 100% | 100%  | 100%   |
| Composition                        | <i>Cricotopus</i> & <i>Chironomus</i> /TC | 100% | 100%  | *      |
| Tolerance                          | Tolerance Percent                         | 100% | 100%  | 40%    |
| Trophic                            | Scraper Percent                           | 80%  | 60%   | 60%    |
| Habit                              | Burrower Taxa                             | 40%  | 0%    | 40%    |
|                                    |                                           |      |       |        |
| Sand Hills                         |                                           | LPL  | Genus | Family |
| Metric Category                    | Metric                                    | D.E. | D.E.  | D.E.   |
| Richness                           | Trichoptera Taxa                          | 50%  | 50%   | 50%    |
| Composition                        | Trichoptera Percent                       | 50%  | 50%   | 50%    |
| Composition                        | <i>Cricotopus</i> & <i>Chironomus</i> /TC | 50%  | 50%   | *      |
| Tolerance                          | Tolerant Taxa                             | 67%  | 67%   | 67%    |
| Trophic                            | Scraper Percent                           | 83%  | 0%    | 67%    |
| Habit                              | Clinger Taxa                              | 33%  | 33%   | 33%    |
|                                    |                                           |      |       |        |
| Southern Metasedimentary Mountains |                                           | LPL  | Genus | Family |
| Metric Category                    | Metric                                    | D.E. | D.E.  | D.E.   |
| Richness                           | EPT Taxa                                  | 80%  | 80%   | 100%   |
| Composition                        | Chironomidae Percent                      | 80%  | 80%   | 80%    |
| Composition                        | Percent<br>Tanypodinae/TC                 | 80%  | *     | *      |
| Tolerance                          | Dominant Percent                          | 80%  | 60%   | 100%   |
| Tolerance                          | NCBI                                      | 60%  | 60%   | *      |
| Trophic                            | Scraper Taxa                              | 100% | 20%   | 100%   |
| Habit                              | Burrower Taxa                             | 60%  | 100%  | 60%    |

\* Indicates metric was non-valid at this taxonomic level and was omitted from the index.



The index for the Sand Hills subcoregion (65c) had only one metric that varied in discrimination efficiency with taxonomic resolution: percent scraper. Percent scraper had 0% discrimination efficiency at genus identification but for identifications to LPL and family level, percent scraper had 83% and 67% discrimination efficiencies, respectively. Four metrics in the Southern Metasedimentary Mountains (66g) index had discrimination efficiencies that varied with taxonomic resolution. Family index EPT taxa had 100% discrimination efficiency, 20% greater discrimination efficiency than in the genus and LPL indices. The metric percent dominant taxa varied in discrimination efficiency from 100% at family identification to 60% at generic identification to 80% at LPL. Burrower taxa discriminated best at generic identification with 100% efficiency, a 40% increase in discrimination efficiency than exhibited in the familial and LPL indices. At generic identification, scraper taxa had discrimination efficiency of 20%, 80% less discrimination efficiency than family and LPL indices.

Overall index scores and discrimination efficiencies varied at each taxonomic level within each subcoregion. Discrimination efficiencies were 100% for both the lowest practical level and generic level indices within the Southern Inner Piedmont subcoregion; the family level index had discrimination efficiency of 80% (Table 3). The Sand Hills subcoregion had the greatest variation among the three subcoregions with discrimination efficiencies at the family level, generic level, and LPL of 50%, 83%, and 67%, respectively.



(Table 4); whereas the DE's for the Southern Metasedimentary Mountains subecoregion were 100% for the three indices (Tables 5).

Table 3. Stream index scores and index discrimination efficiencies (DE's) for the Southern Inner Piedmont.

| Station ID | LPL Index | Genus Index | Family Index |
|------------|-----------|-------------|--------------|
| 45a-35     | 71        | 66          | 84           |
| 45a-50     | 23        | 41          | 27           |
| 45a-59     | 30        | 51          | 33           |
| 45a-61     | 22        | 36          | 42           |
| 45a-90     | 59        | 65          | 59           |
| 45a-03//   | 77        | 84          | 80           |
| 45a-3      | 66        | 79          | 63           |
| 45a-89     | 79        | 63          | 70           |
| HH16       | 77        | 67          | 75           |
| HH18       | 72        | 84          | 78           |
| D.E.       | 100%      | 100%        | 80%          |

Note: Reference sites index scores (blue) and Impaired sites index scores (green).

Table 4. Stream index scores and index discrimination efficiencies (DE's) for the Sand Hills.

| Station ID | LPL Index | Genus Index | Family Index |
|------------|-----------|-------------|--------------|
| 65c-12     | 58        | 65          | 47           |
| 65c-3      | 71        | 70          | 64           |
| 65c-4      | 17        | 15          | 26           |
| 65c-40     | 69        | 81          | 67           |
| 65c-8      | 55        | 71          | 66           |
| 65c-88     | 34        | 41          | 32           |
| 65c-80     | 69        | 76          | 59           |
| 65c-89     | 67        | 67          | 52           |
| HH24       | 78        | 96          | 79           |
| HH25       | 91        | 90          | 92           |
| HH26       | 59        | 72          | 55           |
| D.E.       | 67%       | 83%         | 50%          |



Table 5. Stream index scores and index discrimination efficiencies (DE's) for the Southern Metasedimentary Mountains.

| Station ID | LPL Index | Genus Index | Family Index |
|------------|-----------|-------------|--------------|
| 66g-30     | 25        | 29          | 40           |
| 66g-31     | 35        | 45          | 55           |
| 66g-42     | 59        | 58          | 46           |
| 66g-44     | 37        | 27          | 24           |
| 66g-71     | 45        | 55          | 58           |
| 66g-2      | 63        | 57          | 56           |
| 66g-2-2    | 70        | 61          | 75           |
| 66g-23     | 83        | 87          | 87           |
| 66g-5      | 83        | 74          | 81           |
| 66g-6      | 74        | 80          | 80           |
| D.E.       | 100%      | 100%        | 100%         |

Taxonomic resolution for assessing bioassessment sensitivity was depicted using box and whisker plots. Box and whisker plots display the statistics of a population of sites, including the median value, minimum and maximum values, and the 25<sup>th</sup> and 75<sup>th</sup> percentiles (Figures 2-4).

Identifications to LPL in the Southern Inner Piedmont, to generic level in the Sand Hills, and to familial level in the Southern Metasedimentary Mountains showed the greatest discriminatory efficiency for classifying reference and impaired sites.





Figure 2. Southern Inner Piedmont box and whisker plots exhibiting the distribution of reference condition and impaired index scores for both the family and genus indices as compared to lowest practical level (LPL) score distributions.

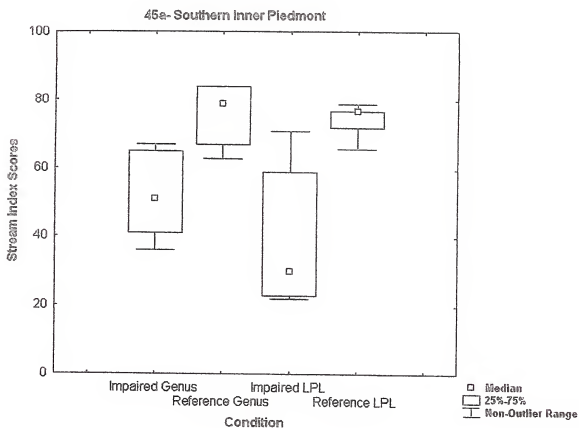
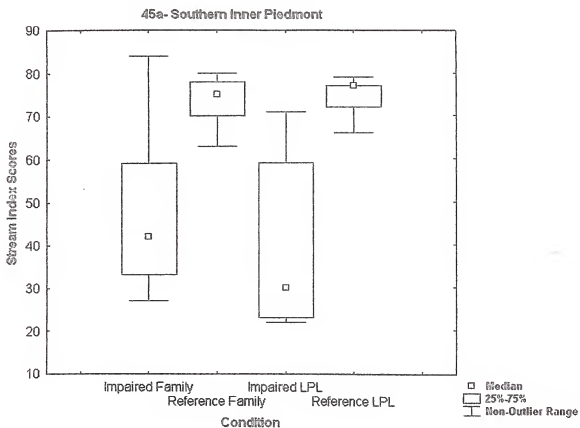






Figure 3. Sand Hills box and whisker plots exhibiting the distribution of reference condition and impaired index scores for both the family and genus indices as compared to lowest practical level (LPL) score distributions.

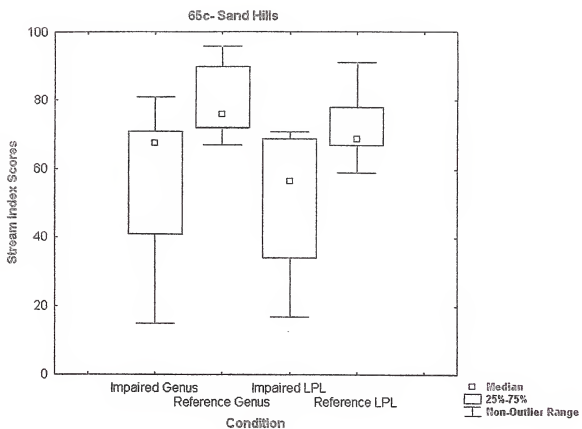
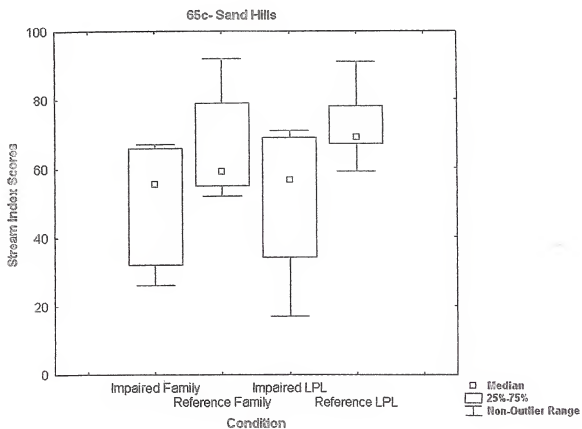
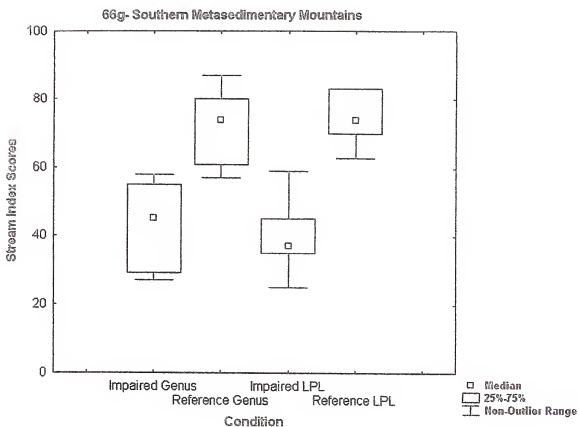
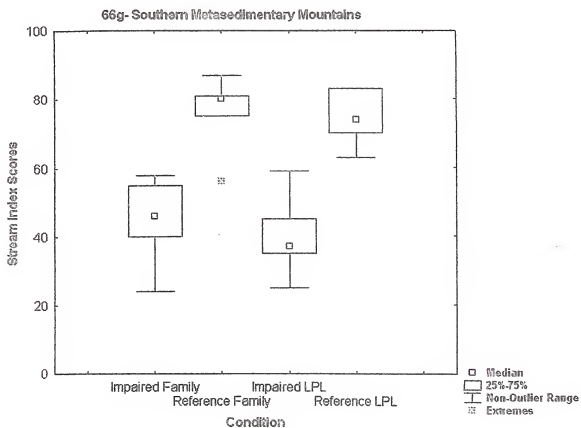






Figure 4. Southern Metasedimentary Mountains box and whisker plots exhibiting the distribution of reference condition and impaired index scores for both the family and genus indices as compared to lowest practical level (LPL) score distributions.





## Time

For 12 impaired sites, approximately forty-one hours were spent mounting chironomid larvae while identification for all macroinvertebrates including the chironomid larvae to LPL took approximately thirty-two hours and forty-five minutes. Time spent on each level of identification for all taxonomic orders, averaged one-half hour for familial level, one hour and forty-five minutes for generic level, and one-half hour for specific level. Average time spent on identification is the cumulative total of time spent on identification for each taxonomic level, in this case two hours and forty-five minutes. However, required mounting time must be included with the identification time to reflect the true costs of identification. By combining cumulative average identification time (two hours and forty-five minutes) with average mounting time (three hours and thirty minutes), cumulative time (costs) spent on identification for all three levels, per sample, averaged six hours and twenty-five minutes (Table 6).

Table 6. Mounting time and identification (ID) time for twelve samples.

| Taxonomic Level | ID Time (hrs) | Mount Time (hrs) | Average ID Time (hrs) | Average Mount Time (hrs) | Average Total ID Time (hrs) |
|-----------------|---------------|------------------|-----------------------|--------------------------|-----------------------------|
| Family          | ~ 4.50        | 0                | ~0.50                 | 0                        | ~0.50                       |
| Genus           | ~21.00        | ~41.0            | ~1.75*                | ~3.50                    | ~5.25                       |
| Species         | ~ 7.50        | 0                | ~0.50*                | 0                        | ~0.50                       |
| Total (LPL)     | ~32.75        | ~41.0            | ~2.75*                | ~3.50                    | ~6.25                       |

Note: Time includes only successful attempts of identification to lower taxonomic levels. It does not account for time spent pursuing lower taxonomic levels that proved unsuccessful.



Identification times and mounting times per subcoregion are shown in Tables 7-9. Total time spent for LPL identification was approximately eight and one-half hours, fifteen and one-half hours, and nine hours for the Southern Inner Piedmont, Sand Hills and Southern Metasedimentary Mountains subcoregions, respectively. The Sand Hills subcoregion required more time than the other two subcoregions for mounting due to the large number of Chironomidae in the samples. Approximately eighteen hours and forty-five minutes were spent mounting chironomid larvae for the Sand Hills, whereas, approximately thirteen hours and fifteen minutes were spent on mounting for the Southern Inner Piedmont. The Southern Metasedimentary Mountains subcoregion required about nine hours and twenty-five minutes for mounting purposes. When identification times and mounting times are combined, average total time spent on taxonomy was approximately five hours and fifteen minutes per sample for the Southern Inner Piedmont subcoregion, eight hours and forty-five minutes per sample for the Sand Hills subcoregion and four hours and thirty minutes per sample for the Southern Metasedimentary Mountains subcoregion.

Table 7. Southern Inner Piedmont identification (ID) and mounting times

| Taxonomic Level | ID Time (hrs) | Mount Time (hrs) | Average ID Time (hrs) | Average Mount Time (hrs) | Average Total ID Time (hrs) |
|-----------------|---------------|------------------|-----------------------|--------------------------|-----------------------------|
| Family          | ~ 1.00        | 0                | ~0.25                 | 0                        | ~0.25                       |
| Genus           | ~ 5.00        | ~13.25           | ~1.25*                | ~3.25                    | ~4.50                       |
| Species         | ~ 2.75        | 0                | ~0.50*                | 0                        | ~0.50                       |
| Total (LPL)     | ~8.50         | ~13.25           | ~2.00*                | ~3.25                    | ~5.25                       |



Table 8. Sand Hills identification (ID) and mounting times

| Taxonomic Level | ID Time (hrs) | Mount Time (hrs) | Average ID Time (hrs) | Average Mount Time (hrs) | Average Total ID Time (hrs) |
|-----------------|---------------|------------------|-----------------------|--------------------------|-----------------------------|
| Family          | ~ 2.00        | 0                | ~0.50                 | 0                        | ~0.50                       |
| Genus           | ~10.75        | ~18.75           | ~2.75*                | ~4.75                    | ~7.50                       |
| Species         | ~ 2.75        | 0                | ~0.75*                | 0                        | ~0.75                       |
| Total (LPL)     | ~15.50        | ~18.75           | ~4.00*                | ~4.75                    | ~8.75                       |

Table 9. Southern Metasedimentary Mountains identification (ID) and mounting times

| Taxonomic Level | ID Time (hrs) | Mount Time (hrs) | Average ID Time (hrs) | Average Mount Time (hrs) | Average Total ID Time (hrs) |
|-----------------|---------------|------------------|-----------------------|--------------------------|-----------------------------|
| Family          | ~1.50         | 0                | ~0.50                 | 0                        | ~0.50                       |
| Genus           | ~5.50         | ~5.50            | ~1.25*                | ~2.25                    | ~3.50                       |
| Species         | ~2.25         | 0                | ~0.50*                | 0                        | ~0.50                       |
| Total (LPL)     | ~9.00         | ~9.25            | ~2.25*                | ~2.25                    | ~4.50                       |

\* Time includes only successful attempts of identification to lower taxonomic levels.



## **DISCUSSION.**

### **Taxonomic Resolution Analysis**

Subecoregion-specific indices for the Southern Upper Piedmont, the Sand Hills, and the Southern Metasedimentary Mountains were evaluated at the family level, genus level and LPL for taxonomic resolution. Analysis, based on discriminatory ability of the indices and depictions of score distributions indicated that taxonomic resolution requirements varied among subecoregions in Georgia.

### **Southern Metasedimentary Mountains**

The invertebrate index for the Southern Metasedimentary Mountains (66g) had discrimination efficiency of 100% when metric scores for the three levels of identification were computed. When index score distributions for LPL, genus level, and family level identifications were compared LPL index scores exhibited slightly greater discrimination potential than familial index scores due to the slightly greater degree of separation between interquartile ranges of reference condition and impaired index scores. Although the family index exhibited a smaller degree of separation between interquartile ranges, the variance among reference condition scores was less than reference condition scores in the LPL index and 100% of reference condition index scores were above the 25<sup>th</sup> percentile threshold. One outlier (outliers may indicate natural variability; misclassification of stream conditions *a priori*, or an under-represented site class)(Jessup and Gerritsen 2000) was depicted in the family index but removing it from the index did not affect discrimination efficiency. Although the generic



index had 100% discrimination efficiency, the degree of separation between the interquartile ranges was not as great as the other two indices. In fact, the slight overlap of whiskers indicates the chance of making a Type I and/or Type II error when identifications to the generic level are considered. Therefore, identification to either LPL or family level is adequate for stream health classification for this subecoregion.

### **Southern Inner Piedmont**

Identification to LPL is recommended for the Southern Inner Piedmont subecoregion. Discrimination efficiencies for the invertebrate index were 80% at family level, 100% at genus level and 100% at LPL. The greatest degree of overlap between reference condition and impaired index scores occurred when identification to family level was considered. In fact, some impaired index scores (whisker) overlapped the entire suite of reference condition index scores indicating a 20% chance of misclassifying stream health. Although some overlap between reference condition and impaired index scores occurred at both the generic and lowest practical identification levels, the LPL index exhibited the greatest degree of separation between interquartile ranges, indicating LPL identification discriminates between reference condition and impaired sites more efficiently than identification to generic level. There was whisker overlap in the LPL index, but all impaired index scores fell below the 25<sup>th</sup> percentile threshold.



## **Sand Hills**

Greatest discrimination between reference condition and impaired index scores for the Sand Hills subcoregion occurred when identification was considered at the generic level. Discrimination efficiencies for the Sand Hill's invertebrate index were 50% at family level, 83% at genus level and 67% at LPL. Overall, the genus index exhibited the least degree of overlap and complete separation of interquartile ranges whereas both LPL and family indices exhibited some degree of overlap of both whiskers and interquartile ranges. There is a 33% chance of error when LPL index is used for classifying stream health; whereas, the chance of error is much less (17%) when the genus index is used. Therefore, identification to generic level is recommended for the Sand Hills subcoregion.

## **Taxonomic Resolution Requirements**

### **Southern Metasedimentary Mountains**

Identification to either LPL or familial level is adequate for the Southern Metasedimentary Mountains region, an area of open low hills, with some rugged, isolated mountains such as the Cohutta Mountains and Fort Mountain. Due to the steepness of terrain, anthropogenic activity is somewhat limited within this region. Because anthropogenic activity is limited, stress imposed on aquatic ecosystems may not be as great as it is in the Sand Hills and the Southern Inner



Piedmont regions, easily inhabited regions of rolling hills and plains and may elucidate why family level identification is sufficient.

Ephemeroptera, Plecoptera, Trichoptera (EPT) taxa are known to exist in relatively pristine areas, and historically they have been used as indicators of good stream health. EPT responses to various stressors have been well documented, and pollution tolerance values have long been established.

EPT taxa and Diptera taxa, particularly Chironomidae, were commonly collected in both reference condition and impaired streams within the Southern Metasedimentary Mountains region. Individual metric discrimination efficiency for the three levels of identification was greatest at family level for both the EPT taxa metric and percent dominant metric; whereas, the metric percent Chironomidae remained constant. Therefore, the increase in index performance at family level can be attributed to the presence and abundance of EPT taxa and the lack of community diversity (Table 10).

These findings are similar to research conducted by Hawkins *et al.* (2000). They found that identification to family level was sufficient in areas of limited taxonomic diversity. Among the three subcoregions studied, the Southern Metasedimentary Mountains scored the lowest (0.556) for biotic diversity, further supporting my recommendation that family level identification is sufficient for this subcoregion.



Table 10. Stream diversity values for Southern Inner Piedmont, Sand Hills, and Southern Metasedimentary Mountains

| <b>Southern Inner Piedmont</b>            |           |           |
|-------------------------------------------|-----------|-----------|
| StationID                                 | Reference | Simpson D |
| 45a-35                                    | No        | 0.022     |
| 45a-50                                    | No        | 0.064     |
| 45a-59                                    | No        | 0.159     |
| 45a-61                                    | No        | 0.046     |
| 45a-90                                    | No        | 0.104     |
| 45a03//                                   | Yes       | 0.101     |
| 45a-3                                     | Yes       | 0.110     |
| 45a-89                                    | Yes       | 0.143     |
| HH16                                      | Yes       | 0.063     |
| HH18                                      | Yes       | 0.123     |
| Sum Of Diversity Values (45a)             |           | 0.935     |
| <b>Sand Hills</b>                         |           |           |
| StationID                                 | Reference | Simpson D |
| 65c-12                                    | No        | 0.071     |
| 65c-3                                     | No        | 0.143     |
| 65c-4                                     | No        | 0.049     |
| 65c-40                                    | No        | 0.105     |
| 65c-8                                     | No        | 0.086     |
| 65c-88                                    | No        | 0.039     |
| 65c-80                                    | Yes       | 0.074     |
| 65c-89                                    | Yes       | 0.111     |
| HH24                                      | Yes       | 0.054     |
| HH25                                      | Yes       | 0.074     |
| HH26                                      | Yes       | 0.068     |
| Sum Of Diversity Values (65c)             |           | 0.875     |
| <b>Southern Metasedimentary Mountains</b> |           |           |
| StationID                                 | Reference | Simpson D |
| 66g-30                                    | No        | 0.093     |
| 66g-31                                    | No        | 0.111     |
| 66g-42                                    | No        | 0.035     |
| 66g-44                                    | No        | 0.070     |
| 66g-71                                    | No        | 0.053     |
| 66g-2                                     | Yes       | 0.074     |
| 66g-2-2                                   | Yes       | 0.038     |
| 66g-23                                    | Yes       | 0.026     |
| 66g-5                                     | Yes       | 0.034     |
| 66g-6                                     | Yes       | 0.022     |
| Sum Of Diversity Values (66g)             |           | 0.556     |



### **Sand Hills**

Identification to generic level is required for the Sand Hills. Metric discrimination efficiencies were similar for all three levels of identification except for the percent scraper metric, which decreased from 83% to 0% when identification data for LPL was reduced to generic level. Yet, even with this loss of information, the genus index discrimination potential was greater than the LPL index. The reduction in information at the generic level for percent scraper may represent ecological noise as suggested by Bailey *et al.* (2001). Also, greater variation in species among the sites may be obfuscating the discriminating potential of the LPL index.

### **Southern Inner Piedmont**

Biotic diversity was highest for this subcoregion (0.935), which might explain identification requirements to LPL. As Resh and Unzicker (1975) reported, established water quality tolerance values for 61 species of the 89 genera fall into different tolerance categories indicating that identification to LPL is necessary to explain the variation among species and their different responses to various stressors. Information gained from the *Cricotopus/Chironomus/Total Chironomidae* metric for both the LPL and genus indices was lost when identification to family was considered, and this metric was not effective at lower taxonomic levels. However, metrics describing organisms' trophic and behavioral



habit (percent scraper and burrower taxa) provided adequate information for discrimination at LPL identification.

### **Cost Benefit Analysis**

As stipulated in the protocol, all organisms were identified to LPL. This level of identification entails a fair amount of investment in time and in money, but identification to LPL is needed before taxonomic resolution analysis can be performed, and it is possible taxonomic resolution to LPL may be the only level of identification that adequately discriminates between reference condition streams and impaired streams. Once taxonomic resolution requirements have been predetermined, cost/benefit analyses can be used to examine not only the real costs of taxonomic work but also the potential savings that would be realized when future benthic work is needed for assessment and monitoring programs.

### **Southern Inner Piedmont**

Average costs incurred, per sample, for taxonomic work in the Southern Inner Piedmont (45a) were \$5.00 for familial identification plus, \$12.50 for generic identification and an additional \$2.50 for identification to species. Costs incurred for identification of organisms from family level to genus level increased an average of \$7.50. Time needed to mount Chironomidae, however, must be included in total costs at taxonomic levels below familial level as chironomid larvae should be clear-mounted to improve identification accuracy. When



mounting time is included with identification time, generic level identification costs averaged \$47.50, an increase of \$35.00 per sample. Identification of organisms to LPL incurred costs of \$55.00 per sample. When total costs for each taxonomic level are compared, family identification, with a minimal average cost of \$5.00 is the most economical level of identification. However, based on the discrimination efficiency value and distribution of index scores, family level index for Southern Inner Piedmont does not discriminate between reference condition and impaired sites in fact, taxonomic resolution to LPL has the greatest discriminatory ability so saving time and money on future taxonomic work in this subecoregion is not feasible.

**Cost/Benefit Analysis Per Sample  
Southern Inner Piedmont Subecoregion (45a)**

**Family Level Costs:**

|                                                          |         |
|----------------------------------------------------------|---------|
| Average time spent on identification (.50 hrs X \$10/hr) | \$ 5.00 |
|----------------------------------------------------------|---------|

**Genus Level Costs:**

|                                                           |         |
|-----------------------------------------------------------|---------|
| Average time spent on identification (1.25 hrs X \$10/hr) | \$12.50 |
|-----------------------------------------------------------|---------|

**Species Level Costs:**

|                                                           |         |
|-----------------------------------------------------------|---------|
| Average time spent on identification (.25 hrs. X \$10/hr) | \$ 2.50 |
|-----------------------------------------------------------|---------|

**Combined Level Identification Costs:**

|                                                            |         |
|------------------------------------------------------------|---------|
| Average time spent on identification (2.00 hrs. X \$10/hr) | \$20.00 |
|------------------------------------------------------------|---------|

**Mounting Costs:**

|                                                                |         |
|----------------------------------------------------------------|---------|
| Average time spent mounting Chironomidae (3.50 hrs. X \$10/hr) | \$35.00 |
|----------------------------------------------------------------|---------|

|                               |                |
|-------------------------------|----------------|
| <b>Total Costs Per Sample</b> | <b>\$55.00</b> |
|-------------------------------|----------------|



### **Sand Hills**

Average identification costs incurred at the familial level for the Sand Hills (65c) was \$7.50. Average identification costs of \$27.50 and average mounting costs of \$47.50 were incurred at the generic level; and totaled \$82.50 per sample when family level costs are included. Average costs for species identification was \$5.00. Identification of organisms to LPL incurred cumulative average costs of \$87.50 per sample when species level identification costs were added to generic and familial level costs. Because the best discriminating index for the Sand Hills is the genus index, costs for future benthic work in this subcoregion would decrease. On average, future savings of \$5.00 per sample would be realized.

### **Southern Metasedimentary Mountains**

Identification costs for familial level for the Southern Metasedimentary Mountains (66g) averaged \$5.00. Generic identification costs totaled \$35.00. Sixty four percent of the generic costs resulted from the two and one quarter hours needed for mounting Chironomidae. Average costs for species identifications were \$5.00 with average costs for identifications to LPL totaling \$45.00 per sample. Although both the LPL index and the family index for this subcoregion provided sufficient information for accurately classifying stream health, in terms of saving time and money, identifications to family, for future benthic work, is sufficient. Because chironomid larvae do not need to be



mounted for family identification, \$40.00 per sample on average would be saved as future identification costs would be about \$5.00 per sample.

**Cost/Benefit Analysis Per Sample  
Sand Hills Subcoregion (65c)**

**Family Level Costs:**

Average time spent on identification (.75 hrs. X \$10/hr) \$ 7.50

**Genus Level Costs:**

Average time spent on identification (2.75 hrs. X \$10/hr) \$27.50

**Species Level Costs:**

Average time spent on identification (.50 hrs. X \$10/hr) \$ 5.00

**Combined Level Identification Costs:**

Average time spent on identification (4.00 hrs. X \$10/hr) \$40.00

**Mounting Costs:**

Average time spent mounting Chironomidae (4.75 hrs. X \$10/hr) \$47.50

**Total Costs Per Sample \$87.50**

**Less Total Costs Per Sample (Genus Level) (\$27.50 + \$47.50 + \$7.50) \$82.50**

**Future Net Savings Per Sample \$ 5.00**

**Note: An average of 5.7% of total costs is saved when future taxonomic work is needed for the Sand Hills.**



**Cost/Benefit Analysis Per Sample****Southern Metasedimentary Mountains Subcoregion (66g)****Family Level Costs:**

|                                                           |         |
|-----------------------------------------------------------|---------|
| Average time spent on identification (.50 hrs. X \$10/hr) | \$ 5.00 |
|-----------------------------------------------------------|---------|

**Genus Level Costs:**

|                                                            |         |
|------------------------------------------------------------|---------|
| Average time spent on identification (1.25 hrs. X \$10/hr) | \$12.50 |
|------------------------------------------------------------|---------|

**Species Level Costs:**

|                                                                  |                |
|------------------------------------------------------------------|----------------|
| <u>Average time spent on identification (.50 hrs. X \$10/hr)</u> | <u>\$ 5.00</u> |
|------------------------------------------------------------------|----------------|

**Combined Level Identification Costs:**

|                                                            |         |
|------------------------------------------------------------|---------|
| Average time spent on identification (2.25 hrs. X \$10/hr) | \$22.50 |
|------------------------------------------------------------|---------|

**Mounting Costs:**

|                                                                       |                |
|-----------------------------------------------------------------------|----------------|
| <u>Average time spent mounting Chironomidae (2.25 hrs. X \$10/hr)</u> | <u>\$22.50</u> |
|-----------------------------------------------------------------------|----------------|

|                               |                |
|-------------------------------|----------------|
| <b>Total Costs Per Sample</b> | <b>\$45.00</b> |
|-------------------------------|----------------|

|                                                   |                       |
|---------------------------------------------------|-----------------------|
| <b>Less Total Costs Per Sample (Family Level)</b> | <b><u>\$ 5.00</u></b> |
|---------------------------------------------------|-----------------------|

|                                      |                |
|--------------------------------------|----------------|
| <b>Future Net Savings Per Sample</b> | <b>\$40.00</b> |
|--------------------------------------|----------------|

**Note: An average of 88.9% of total costs is saved when future taxonomic work is needed for the Southern Metasedimentary Mountains.**



## CONCLUSIONS.

Taxonomic resolution requirements vary among subecoregions in Georgia. However, additional analysis is necessary to conclude whether or not taxonomic resolution requirements vary within all of Georgia's six ecoregions.

The recommended identification levels: LPL for the Southern Inner Piedmont, generic level for the Sand Hills, and familial level for the Southern Metasedimentary Mountains should be implemented before additional assessment or monitoring takes place if costs are to be minimized as the risks of misclassifying stream health can be costly. If classification results in Type-I errors and healthy streams (reference condition) are classified, as impaired, additional time and money will be spent on unnecessary assessments. If classification results in Type-II errors and impaired streams are classified as healthy, costs become even greater because stream health deterioration is compounded over time, which means more assessments and frequent monitoring is necessary, and there is also the possibility that Total Maximum Daily Loads (TMDL's) may be imposed on the streams to control non-point sources of pollution as stipulated in §303(d) of the Clean Water Act (J. Gore, Department of Environmental Science, Columbus University, personal communication). Furthermore, the Environmental Protection Agency (EPA) could issue fines up to \$25,000/per day for any stream not in compliance (Clean Water Act, §305(b)(1)(B), 33 U.S.C., §1315(b)(1)(B) 1999).



Therefore, by predetermining taxonomic resolution requirements and by performing cost/benefit analyses, agencies involved in assessment and monitoring programs would not only minimize risks of misclassifying stream health, they could also identify regions that may require less taxonomic effort, which can lead to savings in terms of time and money.



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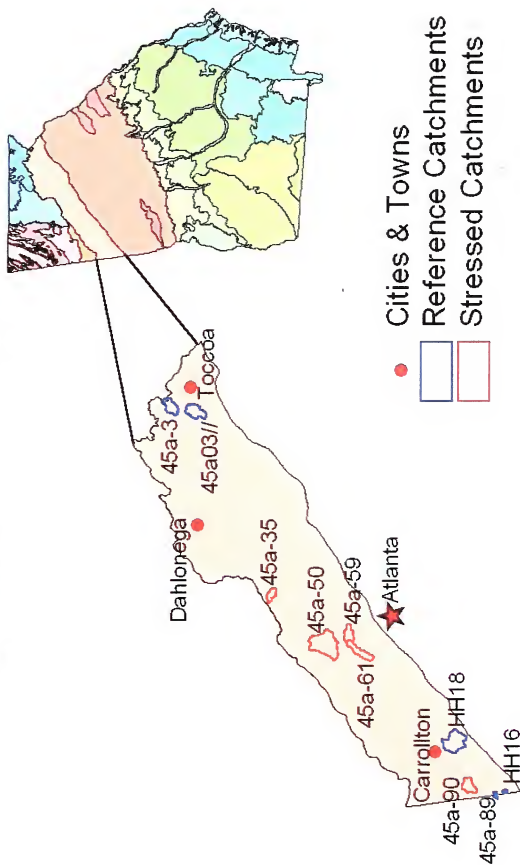
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## **APPENDIX A – MAPS**

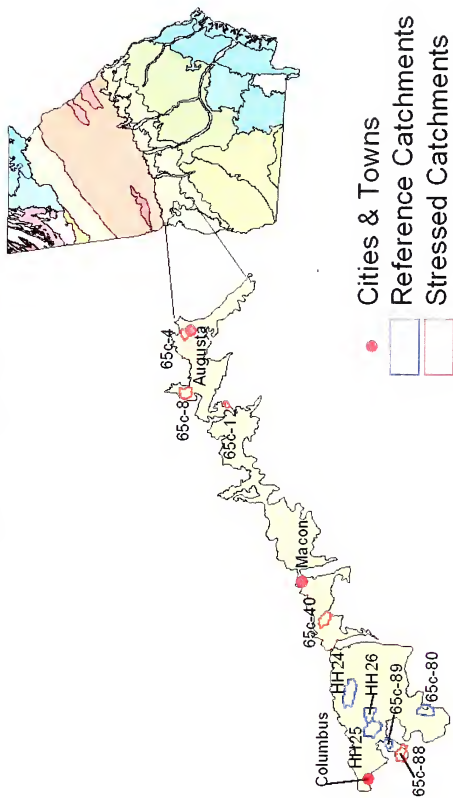


## 45a - Southern Inner Piedmont



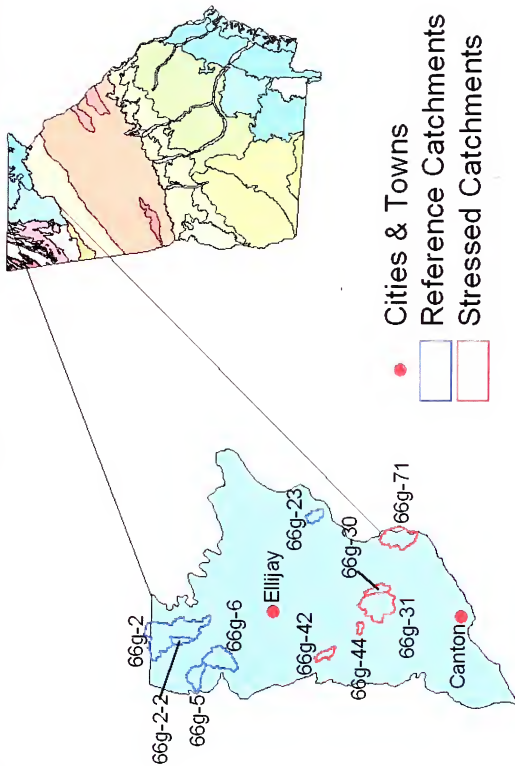


## 65c - Sand Hills





## 66g - Southern Metasedimentary Mountains





## **APPENDIX B – TAXA LISTS AND TAXA REFERENCES**



| Sub-ecoregion /Station ID | Ref. | Order                              | Family                      | Final Identification           | Individuals                   |             |
|---------------------------|------|------------------------------------|-----------------------------|--------------------------------|-------------------------------|-------------|
| Middle Fork Broad River   |      |                                    |                             |                                |                               |             |
| 45a03//                   | Yes  | Coleoptera                         | Elmidae                     | <i>Ancyronyx variegatus</i>    | 1                             |             |
|                           |      |                                    |                             | <i>Microcylloepus pusillus</i> | 1                             |             |
|                           |      |                                    |                             | <i>Promoresia elegans</i>      | 1                             |             |
|                           |      |                                    |                             | <i>Stenelmis</i> sp.           | 2                             |             |
|                           |      |                                    |                             | <i>Dineutus</i> sp.            | 1                             |             |
|                           |      | Diptera                            | Ceratopogonidae             | <i>Bezzia</i> complex          | 2                             |             |
|                           |      |                                    | Chironomidae                | <i>Ablabesmyia annulata</i>    | 10                            |             |
|                           |      | <i>Ablabesmyia mallochii</i>       |                             | 2                              |                               |             |
|                           |      | <i>Ablabesmyia rhamphe</i> grp.    |                             | 1                              |                               |             |
|                           |      | <i>Apedilum</i> sp.                |                             | 4                              |                               |             |
|                           |      | <i>Brillia flavifrons</i>          |                             | 1                              |                               |             |
|                           |      | <i>Clinotanypus</i> sp.            |                             | 1                              |                               |             |
|                           |      | <i>Cryptochironomus</i> sp.        |                             | 1                              |                               |             |
|                           |      | <i>Endotribelos hesperium</i>      |                             | 1                              |                               |             |
|                           |      | <i>Hydrobaenus</i> sp.             |                             | 1                              |                               |             |
|                           |      | <i>Microtendipes</i> sp.           |                             | 1                              |                               |             |
|                           |      | Orthoclaadiinae                    |                             | 1                              |                               |             |
|                           |      | <i>Parakiefferiella</i> A          |                             | 1                              |                               |             |
|                           |      | <i>Paratanytarsus</i> sp.          |                             | 2                              |                               |             |
|                           |      | <i>Phaenopsectra</i> sp.           |                             | 15                             |                               |             |
|                           |      | <i>Phaenopsectra obediens</i> grp. |                             | 66                             |                               |             |
|                           |      | <i>Polypedilum aviceps</i>         |                             | 2                              |                               |             |
|                           |      | <i>Polypedilum halterale</i>       |                             | 1                              |                               |             |
|                           |      | <i>Psectrocladius elatus</i>       |                             | 1                              |                               |             |
|                           |      | <i>Rheotanytarsus</i> sp.          |                             | 4                              |                               |             |
|                           |      | <i>Robackia demejerei</i>          |                             | 1                              |                               |             |
|                           |      | <i>Stenochironomus</i> sp.         |                             | 6                              |                               |             |
|                           |      | <i>Stictochironomus</i> sp.        |                             | 1                              |                               |             |
|                           |      | Tanypodinae                        |                             | 1                              |                               |             |
|                           |      | <i>Tribelos</i> sp.                |                             | 1                              |                               |             |
|                           |      | <i>Tribelos jucundus</i>           |                             | 5                              |                               |             |
|                           |      | <i>Xestochironomus</i>             |                             | 1                              |                               |             |
|                           |      | Ephemeroptera                      | Simuliidae                  | <i>Simulium</i> sp.            | 1                             |             |
|                           |      |                                    |                             | Baetiscidae                    | <i>Baetisca carolina</i>      | 1           |
|                           |      |                                    | <i>Baetisca gibbera</i>     |                                | 1                             |             |
|                           |      |                                    | Heptageniidae               | <i>Stenonema</i> sp.           | 17                            |             |
|                           |      |                                    |                             | Isonychiidae                   | <i>Isonychia</i> sp.          | 1           |
|                           |      |                                    |                             | Potamanthidae                  | <i>Potamanthus distinctus</i> | 5           |
|                           |      |                                    |                             |                                | Megaloptera                   | Corydalidae |
|                           |      |                                    | <i>Nigronia serricornis</i> | 2                              |                               |             |
|                           |      |                                    | Sialidae                    | <i>Sialis</i> sp.              |                               | 1           |
|                           |      |                                    | Odonata                     | Aeshnidae                      | <i>Aeshna umbrosa</i>         | 1           |
|                           |      | Aeshnidae                          |                             |                                | 1                             |             |



|                        |                |                         |                           |                                  |   |
|------------------------|----------------|-------------------------|---------------------------|----------------------------------|---|
|                        | Plecoptera     | Coenagrionidae          | Coenagrionidae            | 2                                |   |
|                        |                |                         | Gomphidae                 | Gomphidae                        | 1 |
|                        |                | <i>Gomphus borealis</i> |                           | 1                                |   |
|                        |                | <i>Lanthus vernalis</i> |                           | 1                                |   |
|                        |                | Perlidae                |                           | <i>Perlesta placida</i>          | 3 |
|                        |                |                         | Perlidae                  | 1                                |   |
|                        |                | Perlodidae              | <i>Yugus bulbosus</i>     | 1                                |   |
|                        |                | Taeniopterygidae        | <i>Strophopteryx</i> sp.  | 5                                |   |
|                        |                | Trichoptera             | Brachycentridae           | Brachycentridae                  | 2 |
|                        |                |                         | Calamoceratidae           | <i>Anisocentropus pyraloides</i> | 1 |
|                        | Hydropsychidae |                         | <i>Cheumatopsyche</i> sp. | 13                               |   |
|                        |                |                         | <i>Hydropsyche</i> sp.    | 1                                |   |
|                        | Trichoptera    | Hydropsychidae          | Hydropsychidae            | 8                                |   |
|                        |                |                         | <i>Potamyia flava</i>     | 5                                |   |
| <i>Nectopsyche</i> sp. |                |                         | 2                         |                                  |   |
| <i>Setodes</i> sp.     |                |                         | 1                         |                                  |   |
| Polycentropodidae      |                |                         | <i>Polycentropus</i> sp.  | 1                                |   |
| Veneroida              |                | Pisidiidae              | <i>Sphaerium</i> sp.      | 1                                |   |
|                        |                |                         | Class: Clitellata         |                                  |   |
|                        |                | Oligochaeta             | 7                         |                                  |   |



| Sub-coregion /Station ID | Ref. | Order           | Family             | Final Identification          | Individuals |
|--------------------------|------|-----------------|--------------------|-------------------------------|-------------|
| Davidson Creek           |      |                 |                    |                               |             |
| 45a-3                    | Yes  | Diptera         | Chironomidae       | <i>Ablabesmyia</i> sp.        | 1           |
|                          |      |                 |                    | <i>Ablabesmyia mallochi</i>   | 1           |
|                          |      |                 |                    | <i>Apedilum</i> sp.           | 2           |
|                          |      |                 |                    | Chironomidae                  | 3           |
|                          |      |                 |                    | <i>Corynoneura</i> B          | 4           |
|                          |      |                 |                    | <i>Larsia</i> sp.             | 2           |
|                          |      |                 |                    | Orthoclaadiinae               | 7           |
|                          |      |                 |                    | <i>Parakiefferiella</i> sp.   | 1           |
|                          |      |                 |                    | <i>Parametriocnemus</i> sp.   | 2           |
|                          |      |                 |                    | <i>Paratanytarsus</i> sp.     | 3           |
|                          |      |                 |                    | <i>Phaenopsectra</i> sp.      | 1           |
|                          |      |                 |                    | <i>Polypedilum aviceps</i>    | 3           |
|                          |      |                 |                    | <i>Polypedilum flavum</i>     | 6           |
|                          |      |                 |                    | <i>Polypedilum fallax</i>     | 1           |
|                          |      |                 |                    | <i>Rheocricotopus</i> sp.     | 1           |
|                          |      |                 |                    | <i>Rheotanytarsus</i> sp.     | 1           |
|                          |      |                 |                    | <i>Thienemanniella</i> sp.    | 14          |
|                          |      |                 |                    | <i>Thienemanniella xena</i>   | 6           |
|                          |      |                 | Simuliidae         | <i>Simulium</i> sp.           | 4           |
|                          |      |                 | Tipulidae          | <i>Pseudolimnophila</i> sp.   | 1           |
|                          |      |                 |                    | <i>Tipula</i> sp.             | 1           |
|                          |      | Ephemeroptera   | Ephemeridae        | <i>Hexagenia</i> sp.          | 1           |
|                          |      |                 | Heptageniidae      | Heptageniidae                 | 1           |
|                          |      |                 |                    | <i>Stenonema</i> sp.          | 4           |
|                          |      |                 | Isonychiidae       | <i>Isonychia</i> sp.          | 5           |
|                          |      | Megaloptera     | Corydalidae        | <i>Corydalus cornutus</i>     | 1           |
|                          |      |                 |                    | <i>Nigronia serricornis</i>   | 1           |
|                          |      | Neotaenioglossa | Pleuroceridae      | <i>Pleurocera</i> sp.         | 1           |
|                          |      | Plecoptera      | Perlidae           | <i>Acroneuria abnormis</i>    | 17          |
|                          |      |                 |                    | <i>Acroneuria internata</i>   | 3           |
|                          |      |                 |                    | Perlidae                      | 2           |
|                          |      |                 | Perlotidae         | <i>Helopicus subvarians</i>   | 1           |
|                          |      |                 | Taeniopterygidae   | <i>Strophopteryx fasciata</i> | 1           |
|                          |      |                 |                    | <i>Strophopteryx limata</i>   | 55          |
|                          |      | Trichoptera     | Hydropsychidae     | <i>Cheumatopsyche</i> sp.     | 23          |
|                          |      |                 |                    | <i>Hydropsyche</i> sp.        | 2           |
|                          |      |                 | Philopotamidae     | <i>Chimarra</i> sp.           | 12          |
| Class: Clitellata        |      |                 | <i>Oligochaeta</i> | 2                             |             |



| Sub-region / Station ID | Ref. | Order                        | Family          | Final Identification                         | Individuals |
|-------------------------|------|------------------------------|-----------------|----------------------------------------------|-------------|
| <b>Smithwick Creek</b>  |      |                              |                 |                                              |             |
| 45a-35                  | No   | Basommatophora<br>Coleoptera | Lymnaeidae      | Lymnaeidae                                   | 1           |
|                         |      |                              | Dryopidae       | <i>Helichus lithophilus</i>                  | 1           |
|                         |      |                              | Dytiscidae      | <i>Celina</i> sp.                            | 1           |
|                         |      |                              | Elmidae         | <i>Ancyronyx variegatus</i>                  | 2           |
|                         |      |                              |                 | <i>Dubiraphia</i> sp.                        | 2           |
|                         |      |                              |                 | <i>Macronychus glabratus</i>                 | 1           |
|                         |      |                              |                 | <i>Microcylloepus pusillus</i>               | 2           |
|                         |      |                              |                 | <i>Optioservus</i> sp.                       | 4           |
|                         |      |                              |                 | <i>Optioservus ovalis</i>                    | 1           |
|                         |      |                              | Psephenidae     | <i>Psephenus hericki</i>                     | 1           |
|                         |      | Decapoda                     | Cambaridae      | <i>Procambarus</i> sp.                       | 1           |
|                         |      | Diptera                      | Ceratopogonidae | <i>Bezzia</i> complex                        | 1           |
|                         |      |                              | Chironomidae    | <i>Ablabesmyia</i> sp.                       | 1           |
|                         |      |                              |                 | <i>Ablabesmyia mallochi</i>                  | 2           |
|                         |      |                              |                 | <i>Brillia</i> sp.                           | 3           |
|                         |      |                              |                 | <i>Brillia flavifrons</i>                    | 2           |
|                         |      |                              |                 | <i>Chironomus</i> sp.                        | 8           |
|                         |      |                              |                 | <i>Corynoneura</i> sp.                       | 1           |
|                         |      |                              |                 | <i>Cricotopus bicinctus</i>                  | 7           |
|                         |      |                              |                 | <i>Cryptochironomus</i> sp.                  | 4           |
|                         |      |                              |                 | <i>Microtendipes pedellus</i> grp.           | 3           |
|                         |      |                              |                 | <i>Odontomesa fulva</i>                      | 1           |
|                         |      |                              |                 | <i>Orthocladius</i> sp.                      | 2           |
|                         |      |                              |                 | <i>Orthocladius obumbratus</i>               | 4           |
|                         |      |                              |                 | <i>Paracladopelma</i> sp.                    | 1           |
|                         |      |                              |                 | <i>Parakiefferiella</i> E                    | 1           |
|                         |      |                              |                 | <i>Paralauterborniella nigrohalterale</i>    | 1           |
|                         |      |                              |                 | <i>Parametrioctenemus</i> sp.                | 6           |
|                         |      |                              |                 | <i>Paratendipes albianus</i>                 | 1           |
|                         |      |                              |                 | <i>Phaenopsectra obediens</i> grp.           | 4           |
|                         |      |                              |                 | <i>Phaenopsectra punctipes</i> grp.          | 1           |
|                         |      |                              |                 | <i>Phaenopsectra/Tribelos</i> complex        | 6           |
|                         |      |                              |                 | <i>Polypedilum</i> A                         | 2           |
|                         |      |                              |                 | <i>Polypedilum aviceps</i>                   | 1           |
|                         |      |                              |                 | <i>Polypedilum scalaenum</i>                 | 2           |
|                         |      |                              |                 | <i>Polypedilum tritum</i>                    | 1           |
|                         |      |                              |                 | <i>Potthastia longimana</i>                  | 2           |
|                         |      |                              |                 | <i>Procladius</i> ( <i>Holotanypus</i> ) sp. | 2           |
|                         |      |                              |                 | <i>Pseudochironomus</i> sp.                  | 1           |
|                         |      |                              |                 | <i>Rheotanytarsus</i> sp.                    | 1           |
|                         |      |                              |                 | <i>Rheotanytarsus exiguus</i> group          | 1           |
|                         |      |                              |                 | <i>Rheotanytarsus pellucidus</i>             | 6           |



|  |  |  |                  |                                       |                      |                     |             |
|--|--|--|------------------|---------------------------------------|----------------------|---------------------|-------------|
|  |  |  |                  | Stempellinella/Zavrelia complex       | 1                    |                     |             |
|  |  |  |                  | Stenochironomus sp.                   | 1                    |                     |             |
|  |  |  |                  | Tanytarsus sp.                        | 2                    |                     |             |
|  |  |  |                  | Tanytarsus A                          | 3                    |                     |             |
|  |  |  |                  | Tanytarsus C                          | 1                    |                     |             |
|  |  |  |                  | Tanytarsus G                          | 2                    |                     |             |
|  |  |  |                  | Tanytarsus J                          | 1                    |                     |             |
|  |  |  |                  | Tanytarsus M                          | 2                    |                     |             |
|  |  |  |                  | Tanytarsus Q                          | 2                    |                     |             |
|  |  |  |                  | Thienemanniella sp.                   | 1                    |                     |             |
|  |  |  |                  | Thienemanniella B                     | 2                    |                     |             |
|  |  |  |                  | Thienemannimyia group sp.             | 15                   |                     |             |
|  |  |  |                  | Tribelos sp.                          | 3                    |                     |             |
|  |  |  |                  | Tribelos fuscicome                    | 1                    |                     |             |
|  |  |  |                  | Tribelos jucundus                     | 7                    |                     |             |
|  |  |  |                  | Zavrelimyia thryptica                 | 1                    |                     |             |
|  |  |  |                  | Hemerodromia sp.                      | 5                    |                     |             |
|  |  |  |                  | Empididae                             | Antocha sp.          | 4                   |             |
|  |  |  |                  | Tipulidae                             | Tipula sp.           | 1                   |             |
|  |  |  |                  |                                       | Tipulidae            | 1                   |             |
|  |  |  | Ephemeroptera    |                                       | Ephemerellidae       | Ephemerella argo    | 1           |
|  |  |  |                  |                                       | Ephemerellidae       | 11                  |             |
|  |  |  |                  |                                       | Serratella deficiens | 3                   |             |
|  |  |  |                  |                                       | Ephemeridae          | Hexagenia limbata   | 5           |
|  |  |  |                  | Heptageniidae                         | Heptageniidae        | 2                   |             |
|  |  |  |                  |                                       | Stenonema sp.        | 10                  |             |
|  |  |  |                  |                                       | Stenonema modestum   | 20                  |             |
|  |  |  |                  | Leptophlebiidae                       | Leptophlebiidae      | 1                   |             |
|  |  |  |                  | Siphonuridae                          | Siphonuridae         | 4                   |             |
|  |  |  |                  | Odonata                               | Coenagrionidae       | Argia sp.           | 2           |
|  |  |  |                  |                                       | Gomphidae            | Progomphus obscurus | 1           |
|  |  |  | Capniidae        |                                       | Capniidae            | 7                   |             |
|  |  |  | Nemouridae       |                                       | Nemouridae           | 1                   |             |
|  |  |  | Perlidae         |                                       | Perlidae             | 1                   |             |
|  |  |  | Perlodidae       |                                       | Isoperla marlynia    | 1                   |             |
|  |  |  |                  |                                       | Perlodidae           | 3                   |             |
|  |  |  | Taeniopterygidae |                                       | Oemopteryx complex   | 1                   |             |
|  |  |  | Trichoptera      |                                       | Hydropsychidae       | Cheumatopsyche sp.  | 5           |
|  |  |  |                  | Hydropsyche betteni/depravata complex |                      | 3                   |             |
|  |  |  |                  | Hydropsychidae                        |                      | 1                   |             |
|  |  |  |                  | Limnephiliidae                        | Hydatophylax argus   | 1                   |             |
|  |  |  |                  | Philopotamidae                        | Chimarra sp.         | 1                   |             |
|  |  |  |                  | Psychomyiidae                         | Lype diversa         | 1                   |             |
|  |  |  |                  | Class: Clitellata                     |                      |                     | Oligochaeta |



| Sub-ecoregion /Station ID | Ref. | Order       | Family         | Final Identification            | Individuals      |               |   |
|---------------------------|------|-------------|----------------|---------------------------------|------------------|---------------|---|
| Noonday Creek             |      |             |                |                                 |                  |               |   |
| 45a-50                    | No   | Coleoptera  | Elmidae        | Ancyronyx variegatus            | 2                |               |   |
|                           |      | Diptera     | Chironomidae   | Ablabesmyia mallochi            | 2                |               |   |
|                           |      |             |                | Brillia flavifrons              | 1                |               |   |
|                           |      |             |                | Chironomus sp.                  | 6                |               |   |
|                           |      |             |                | Corynoneura sp.                 | 17               |               |   |
|                           |      |             |                | Corynoneura B                   | 1                |               |   |
|                           |      |             |                | Cricotopus bicinctus            | 33               |               |   |
|                           |      |             |                | Cricotopus sylvestris group     | 5                |               |   |
|                           |      |             |                | Cricotopus/Orthocladius complex | 1                |               |   |
|                           |      |             |                | Eukiefferiella brehmi group     | 2                |               |   |
|                           |      |             |                | Labrundinia pilosella           | 1                |               |   |
|                           |      |             |                | Micropsectra D                  | 1                |               |   |
|                           |      |             |                | Orthocladius sp.                | 2                |               |   |
|                           |      |             |                | Orthocladius dentifer           | 1                |               |   |
|                           |      |             |                | Parakiefferiella B              | 2                |               |   |
|                           |      |             |                | Parametrioctenus sp.            | 1                |               |   |
|                           |      |             |                | Paratrichocladius sp.           | 1                |               |   |
|                           |      |             |                | Phaenopsectra obediens grp.     | 1                |               |   |
|                           |      |             |                | Phaenopsectra punctipes grp.    | 2                |               |   |
|                           |      |             |                | Phaenopsectra/Tribelos complex  | 3                |               |   |
|                           |      |             |                | Polypedium flavum               | 3                |               |   |
|                           |      |             |                | Polypedium scalaenum            | 1                |               |   |
|                           |      |             |                | Potthastia longimana            | 4                |               |   |
|                           |      |             |                | Rheocricotopus robacki          | 6                |               |   |
|                           |      |             |                | Rheotanytarsus exiguus group    | 2                |               |   |
|                           |      |             |                | Rheotanytarsus pellucidus       | 12               |               |   |
|                           |      |             |                | Tanytarsus sp.                  | 1                |               |   |
|                           |      |             |                | Tanytarsus C                    | 1                |               |   |
|                           |      |             |                | Tanytarsus L                    | 1                |               |   |
|                           |      |             |                | Tanytarsus U                    | 11               |               |   |
|                           |      |             |                | Thienemanniella sp.             | 3                |               |   |
|                           |      |             |                | Thienemanniella xena            | 10               |               |   |
|                           |      |             |                | Thienemannimyia group sp.       | 9                |               |   |
|                           |      |             |                | Tribelos sp.                    | 1                |               |   |
|                           |      |             |                | Tribelos jucundus               | 2                |               |   |
|                           |      |             |                | Empididae                       | Hemerodromia sp. | 13            |   |
|                           |      |             |                | Ephemeroptera                   | Baetidae         | Baetidae      | 4 |
|                           |      |             |                |                                 | Heptageniidae    | Heptageniidae | 1 |
|                           |      | Trichoptera | Hydropsychidae | Cheumatopsyche sp.              | 25               |               |   |
|                           |      |             |                | Hydropsyche sp.                 | 2                |               |   |
|                           |      |             |                | Hydropsychidae                  | 6                |               |   |
| Class: Clitellata         |      |             |                | Oligochaeta                     | 2                |               |   |



| Sub-ecoregion /Station ID | Ref. | Order             | Family              | Final Identification                   | Individuals |
|---------------------------|------|-------------------|---------------------|----------------------------------------|-------------|
| Rottenwood Creek          |      |                   |                     |                                        |             |
| 45a-59                    | No   | Coleoptera        | Elmidae             | <i>Ancyronyx variegatus</i>            | 1           |
|                           |      | Decapoda          | Cambaridae          | <i>Procambarus spiculifer</i>          | 6           |
|                           |      | Diptera           | Ceratopogonidae     | <i>Bezzia</i> complex                  | 1           |
|                           |      |                   |                     | <i>Dasyhelea</i> sp.                   | 1           |
|                           |      | Chironomidae      |                     | <i>Ablabesmyia mallochi</i>            | 5           |
|                           |      |                   |                     | <i>Chironomus</i> sp.                  | 5           |
|                           |      |                   |                     | <i>Cricotopus politus</i>              | 10          |
|                           |      |                   |                     | <i>Dicrotendipes</i> sp.               | 1           |
|                           |      |                   |                     | <i>Endochironomus nymphoides</i> group | 1           |
|                           |      |                   |                     | <i>Endotribelos hesperium</i>          | 1           |
|                           |      |                   |                     | <i>Larsia</i> sp.                      | 1           |
|                           |      |                   |                     | <i>Nanocladius</i> sp.                 | 5           |
|                           |      |                   |                     | <i>Parametrioctenemus</i> sp.          | 1           |
|                           |      |                   |                     | <i>Paratanytarsus dissimilis</i>       | 1           |
|                           |      |                   |                     | <i>Phaenopsectra obediens</i> grp.     | 5           |
|                           |      |                   |                     | <i>Phaenopsectra/Tribelos</i> complex  | 1           |
|                           |      |                   |                     | <i>Polypedium A</i>                    | 1           |
|                           |      |                   |                     | <i>Polypedium fallax</i>               | 1           |
|                           |      |                   |                     | <i>Polypedium flavum</i>               | 2           |
|                           |      |                   |                     | <i>Polypedium halterale</i>            | 13          |
|                           |      |                   |                     | <i>Polypedium illinoense</i>           | 1           |
|                           |      |                   |                     | <i>Rheocricotopus robacki</i>          | 2           |
|                           |      |                   |                     | <i>Rheosmittia arcuata</i>             | 71          |
|                           |      |                   |                     | <i>Rheotanytarsus A</i>                | 1           |
|                           |      |                   |                     | <i>Rheotanytarsus pellucidus</i>       | 1           |
|                           |      |                   |                     | <i>Saetheria tylus</i>                 | 3           |
|                           |      |                   |                     | <i>Stenochironomus</i> sp.             | 1           |
|                           |      |                   |                     | Tanypodinae                            | 1           |
|                           |      |                   |                     | <i>Tanytarsus</i> sp.                  | 1           |
|                           |      |                   |                     | <i>Thienemanniella</i> sp.             | 2           |
|                           |      |                   |                     | <i>Thienemanniella xena</i>            | 2           |
|                           |      |                   |                     | <i>Thienemannimyia</i> group sp.       | 8           |
|                           |      |                   |                     | <i>Tribelos jucundus</i>               | 1           |
|                           |      |                   |                     | <i>Trissopelopia ogemawi</i>           | 1           |
|                           |      |                   |                     | <i>Zavrelimyia thryptica</i>           | 3           |
|                           |      | Simuliidae        | Simuliidae          | 1                                      |             |
|                           |      |                   | <i>Simulium</i> sp. | 4                                      |             |
|                           |      | Tipulidae         | <i>Pedicia</i> sp.  | 3                                      |             |
|                           |      |                   | <i>Pilaria</i> sp.  | 1                                      |             |
|                           |      | Heteroptera       | Veliidae            | <i>Rhagovelia</i> sp.                  | 1           |
|                           |      | Odonata           | Calopterygidae      | <i>Calopteryx</i> sp.                  | 1           |
|                           |      |                   | Coenagrionidae      | <i>Argia</i> sp.                       | 4           |
|                           |      | Trichoptera       | Hydropsychidae      | Hydropsychidae                         | 1           |
|                           |      | Class: Clitellata |                     |                                        |             |



| Sub-ecoregion /Station ID | Ref. | Order          | Family       | Final Identification                  | Individuals |
|---------------------------|------|----------------|--------------|---------------------------------------|-------------|
| <b>Olley Creek</b>        |      |                |              |                                       |             |
| 45a-61                    | No   | Amphipoda      | Gammaridae   | <i>Gammarus</i> sp.                   | 1           |
|                           |      |                | Talitridae   | <i>Hyalella azteca</i>                | 8           |
|                           |      | Basommatophora | Physidae     | <i>Physella</i> sp.                   | 2           |
|                           |      |                | Planorbidae  |                                       | 1           |
|                           |      | Coleoptera     | Elmidae      | <i>Ancyronyx variegatus</i>           | 8           |
|                           |      |                |              | <i>Dubiraphia vittata</i>             | 1           |
|                           |      |                |              | <i>Microcylloepus pusillus</i>        | 1           |
|                           |      |                | Gyrinidae    | <i>Dineutus</i> sp.                   | 3           |
|                           |      |                |              | <i>Dineutus robertsi</i>              | 2           |
|                           |      |                |              |                                       |             |
|                           |      | Decapoda       | Cambaridae   | <i>Procambarus spiculifer</i>         | 2           |
|                           |      | Diptera        | Chaoboridae  | <i>Chaoborus</i> sp.                  | 2           |
|                           |      |                | Chironomidae | <i>Ablabesmyia</i> sp.                | 2           |
|                           |      |                |              | <i>Ablabesmyia mallochi</i>           | 6           |
|                           |      |                |              | <i>Chironomus</i> sp.                 | 37          |
|                           |      |                |              | <i>Corynoneura</i> sp.                | 1           |
|                           |      |                |              | <i>Cricotopus annulator</i> complex   | 1           |
|                           |      |                |              | <i>Cricotopus bicinctus</i>           | 14          |
|                           |      |                |              | <i>Cryptochironomus</i> sp.           | 2           |
|                           |      |                |              | <i>Dicrotendipes</i> sp.              | 4           |
|                           |      |                |              | <i>Dicrotendipes nervosus</i>         | 1           |
|                           |      |                |              | <i>Labrundinia pilosella</i>          | 2           |
|                           |      |                |              | <i>Nanocladius</i> sp.                | 1           |
|                           |      |                |              | <i>Orthocladus carlatus</i>           | 1           |
|                           |      |                |              | <i>Orthocladus oliveri</i>            | 2           |
|                           |      |                |              | <i>Parakiefferella B</i>              | 1           |
|                           |      |                |              | <i>Paratanytarsus</i> sp.             | 7           |
|                           |      |                |              | <i>Paratanytarsus dissimilis</i>      | 1           |
|                           |      |                |              | <i>Paratendipes albianus</i>          | 4           |
|                           |      |                |              | <i>Phaenopsectra obediens</i> grp.    | 3           |
|                           |      |                |              | <i>Phaenopsectra punctipes</i> grp.   | 3           |
|                           |      |                |              | <i>Phaenopsectra/Tribelos</i> complex | 13          |
|                           |      |                |              | <i>Polypedium fallax</i>              | 2           |
|                           |      |                |              | <i>Polypedium scalaenum</i>           | 1           |
|                           |      |                |              | <i>Potthastia longimana</i>           | 2           |
|                           |      |                |              | <i>Procladius</i> sp.                 | 2           |
|                           |      |                |              | <i>Psectrocladius simulans</i>        | 1           |
|                           |      |                |              | <i>Reomyia</i> sp.                    | 1           |
|                           |      |                |              | <i>Rheotanytarsus</i> sp.             | 1           |
|                           |      |                |              | <i>Rheotanytarsus exiguus</i> group   | 1           |
|                           |      |                |              | <i>Rheotanytarsus pellucidus</i>      | 1           |
|                           |      |                |              | <i>Stenochironomus</i> sp.            | 2           |
|                           |      |                |              | <i>Tanytarsus</i> sp.                 | 9           |
|                           |      |                |              | <i>Thienemannimyia</i> group sp.      | 8           |



|  |  |                   |                |                             |    |
|--|--|-------------------|----------------|-----------------------------|----|
|  |  |                   |                | <i>Tribelos jucundus</i>    | 6  |
|  |  |                   | Dixidae        | <i>Dixella indiana</i>      | 3  |
|  |  | Ephemeroptera     | Baetiscidae    | <i>Baetisca obesa</i>       | 1  |
|  |  |                   | Ephemerellidae | <i>Eurylophella bicolor</i> | 1  |
|  |  |                   | Heptageniidae  | Heptageniidae               | 4  |
|  |  |                   |                | <i>Stenonema modestum</i>   | 15 |
|  |  | Odonata           | Aeshnidae      | <i>Boyeria vinosa</i>       | 1  |
|  |  |                   | Calopterygidae | <i>Calopteryx</i> sp.       | 1  |
|  |  |                   |                | <i>Calopteryx dimidiata</i> | 1  |
|  |  |                   | Coenagrionidae | <i>Argia</i> sp.            | 1  |
|  |  |                   |                | <i>Enallagma</i> sp.        | 2  |
|  |  |                   | Gomphidae      | <i>Progomphus</i> sp.       | 4  |
|  |  | Veneroida         | Corbiculidae   | <i>Corbicula fluminea</i>   | 9  |
|  |  |                   | Pisidiidae     | <i>Pisidium</i> sp.         | 14 |
|  |  | Class: Clitellata |                | Oligochaeta                 | 9  |



| Sub-ecoregion /Station ID   | Ref. | Order         | Family           | Final Identification             | Individuals |
|-----------------------------|------|---------------|------------------|----------------------------------|-------------|
| <b>Hillabahatchee Creek</b> |      |               |                  |                                  |             |
| 45a-89                      | Yes  | Amphipoda     | Talitridae       | <i>Hyalella azteca</i>           | 10          |
|                             |      | Coleoptera    | Curculionidae    | Curculionidae                    | 1           |
|                             |      |               | Dryopidae        | <i>Helichus</i> sp.              | 1           |
|                             |      |               | Elmidae          | <i>Ancyronyx variegatus</i>      | 9           |
|                             |      |               |                  | <i>Dubiraphia</i> sp.            | 5           |
|                             |      |               |                  | <i>Dubiraphia bivittata</i>      | 9           |
|                             |      |               |                  | <i>Dubiraphia quadrinotata</i>   | 4           |
|                             |      |               |                  | Elmidae                          | 2           |
|                             |      |               |                  | <i>Macronychus glabratus</i>     | 3           |
|                             |      |               |                  | <i>Optioservus</i> sp.           | 5           |
|                             |      |               |                  | <i>Promoresia tardella</i>       | 1           |
|                             |      |               |                  | <i>Stenelmis</i> sp.             | 67          |
|                             |      |               | Gyrinidae        | <i>Gyrinus</i> sp.               | 2           |
|                             |      | Diptera       | Ceratopogonidae  | <i>Bezzia</i> complex            | 2           |
|                             |      |               | Chironomidae     | <i>Apedilum</i> sp.              | 6           |
|                             |      |               |                  | Chironomidae                     | 1           |
|                             |      |               |                  | <i>Nanocladius</i> sp.           | 1           |
|                             |      |               |                  | <i>Paratanytarsus</i> sp.        | 1           |
|                             |      |               |                  | <i>Phaenopsectra</i> sp.         | 1           |
|                             |      |               |                  | <i>Polypedilum A</i>             | 2           |
|                             |      |               |                  | <i>Polypedilum fallax</i>        | 1           |
|                             |      |               |                  | <i>Polypedilum halterale</i>     | 1           |
|                             |      |               |                  | <i>Polypedilum scalaenum</i>     | 2           |
|                             |      |               |                  | <i>Pseudochironomus</i> sp.      | 1           |
|                             |      |               |                  | <i>Stelechomyia perpulchra</i>   | 1           |
|                             |      |               |                  | <i>Thienemannimyia group</i> sp. | 1           |
|                             |      |               |                  | <i>Tribelos jucundus</i>         | 2           |
|                             |      |               | Simuliidae       | <i>Simulium</i> sp.              | 1           |
|                             |      |               | Tipulidae        | Tipulidae                        | 1           |
|                             |      | Ephemeroptera | Heptageniidae    | <i>Stenonema</i> sp.             | 17          |
|                             |      | Hemiptera     | Veliidae         | <i>Microvelia</i> sp.            | 1           |
|                             |      | Isopoda       | Asellidae        | Asellidae                        | 1           |
|                             |      | Odonata       | Coenagrionidae   | Coenagrionidae                   | 2           |
|                             |      | Plecoptera    | Perlidae         | <i>Acroneuria internata</i>      | 2           |
|                             |      |               | Taeniopterygidae | <i>Strophopteryx limata</i>      | 41          |
|                             |      | Trichoptera   | Calamoceratidae  | <i>Anisocentropus pyraloides</i> | 1           |
|                             |      |               | Hydropsychidae   | <i>Cheumatopsyche</i> sp.        | 6           |
|                             |      |               | Philopotamidae   | <i>Chimarra</i> sp.              | 2           |



| Sub-ecoregion /Station ID | Ref. | Order          | Family                   | Final Identification                   | Individuals |
|---------------------------|------|----------------|--------------------------|----------------------------------------|-------------|
| <b>Mountain Creek</b>     |      |                |                          |                                        |             |
| 45a-90                    | No   | Basommatophora | Physidae                 | <i>Physella</i> sp.                    | 1           |
|                           |      |                | Planorbidae              | <i>Gyraulus</i> sp.                    | 2           |
|                           |      | Coleoptera     | Curculionidae            | <i>Anchytarsus bicolor</i>             | 1           |
|                           |      |                | Dytiscidae               | <i>Celina</i> sp.                      | 3           |
|                           |      | Elmidae        | Dytiscidae               | Dytiscidae                             | 1           |
|                           |      |                | Ancyronyx                | <i>Ancyronyx variegatus</i>            | 1           |
|                           |      |                | Dubiraphia               | <i>Dubiraphia</i> sp.                  | 5           |
|                           |      |                | Elmidae                  | Elmidae                                | 4           |
|                           |      |                | Macronychus              | <i>Macronychus glabratus</i>           | 1           |
|                           |      |                | Microcylloepus           | <i>Microcylloepus pusillus</i>         | 6           |
|                           |      |                | Stenelmis                | <i>Stenelmis</i> sp.                   | 1           |
|                           |      | Psephenidae    | <i>Psephenus hericki</i> |                                        | 1           |
|                           |      | Decapoda       | Cambaridae               | <i>Procambarus spiculifer</i>          | 1           |
|                           |      | Diptera        | Ceratopogonidae          | Ceratopogonidae                        | 1           |
|                           |      |                | Chironominae             | Chironominae                           | 1           |
|                           |      |                | Chironomus               | <i>Chironomus</i> sp.                  | 2           |
|                           |      |                | Cricotopus               | <i>Cricotopus bicornatus</i>           | 1           |
|                           |      |                | Cricotopus/Orthocladius  | <i>Cricotopus/Orthocladius</i> complex | 1           |
|                           |      |                | Cryptochironomus         | <i>Cryptochironomus</i> sp.            | 1           |
|                           |      |                | Labrundinia              | <i>Labrundinia pilosella</i>           | 1           |
|                           |      |                | Microtendipes            | <i>Microtendipes</i> sp.               | 65          |
|                           |      |                | Orthocladius             | <i>Orthocladius</i> sp.                | 2           |
|                           |      |                | Parametricnismus         | <i>Parametricnismus</i> sp.            | 1           |
|                           |      |                | Phaenopsectra            | <i>Phaenopsectra obediens</i> grp.     | 3           |
|                           |      |                | Phaenopsectra/Tribelos   | <i>Phaenopsectra/Tribelos</i> complex  | 2           |
|                           |      |                | Polypedilum              | <i>Polypedilum aviceps</i>             | 1           |
|                           |      |                | Pseudorthocladius        | <i>Pseudorthocladius</i> sp.           | 5           |
|                           |      |                | Rheocricotopus           | <i>Rheocricotopus</i> sp.              | 1           |
|                           |      |                | Tanytarsus               | <i>Tanytarsus M</i>                    | 2           |
|                           |      |                | Thienemannimyia          | <i>Thienemannimyia</i> group sp.       | 13          |
|                           |      |                | Tribelos                 | <i>Tribelos jucundus</i>               | 1           |
|                           |      | Tipulidae      | Leptotarsus              | <i>Leptotarsus</i> sp.                 | 1           |
|                           |      |                | Tipula                   | <i>Tipula</i> sp.                      | 3           |
|                           |      | Ephemeroptera  | Baetiscidae              | <i>Baetisca carolina</i>               | 1           |
|                           |      |                | Heptageniidae            | Heptageniidae                          | 7           |
|                           |      |                | Leptophlebiidae          | <i>Leptophlebia</i> sp.                | 6           |
|                           |      | Heteroptera    | Gerridae                 | Gerridae                               | 1           |
|                           |      |                | Asellidae                | Asellidae                              | 1           |
|                           |      | Odonata        | Calopterygidae           | <i>Calopteryx</i> sp.                  | 2           |
|                           |      |                | Gomphidae                | Gomphidae                              | 1           |
|                           |      | Plecoptera     | Capniidae                | Capniidae                              | 19          |
|                           |      |                | Perlodidae               | Perlodidae                             | 4           |
|                           |      | Trichoptera    | Hydropsychidae           | <i>Ceratopsyche</i> sp.                | 4           |
|                           |      |                | Hydropsychidae           | <i>Cheumatopsyche</i> sp.              | 21          |
|                           |      |                | Hydropsychidae           | <i>Hydropsyche</i> sp.                 | 3           |
|                           |      |                | Hydropsychidae           | Hydropsychidae                         | 26          |



|  |  |                   |              |   |
|--|--|-------------------|--------------|---|
|  |  | Leptoceridae      | Leptoceridae | 1 |
|  |  | Class: Clitellata | Oligochaeta  | 3 |



| Sub-ecoregion /Station ID | Ref. | Order         | Family           | Final Identification             | Individuals |
|---------------------------|------|---------------|------------------|----------------------------------|-------------|
| Town Creek                |      |               |                  |                                  |             |
| HH16                      | Yes  | Coleoptera    | Dryopidae        | <i>Helichus</i> sp.              | 1           |
|                           |      |               | Elmidae          | <i>Ancyronyx variegatus</i>      | 1           |
|                           |      |               |                  | <i>Dubiraphia</i> sp.            | 6           |
|                           |      |               |                  | <i>Macronychus glabratus</i>     | 1           |
|                           |      |               |                  | <i>Optioservus</i> sp.           | 21          |
|                           |      |               |                  | <i>Promoresia</i> sp.            | 1           |
|                           |      |               |                  | <i>Promoresia tardella</i>       | 1           |
|                           |      |               |                  | <i>Stenelmis</i> sp.             | 2           |
|                           |      |               | Gyrinidae        | <i>Dineutus</i> sp.              | 2           |
|                           |      |               | Hydrophilidae    | <i>Helophorus</i> sp.            | 1           |
|                           |      |               | Psephenidae      | <i>Psephenus hericki</i>         | 8           |
|                           |      | Decapoda      | Cambaridae       | <i>Cambarus bartonii</i>         | 1           |
|                           |      | Diptera       | Ceratopogonidae  | <i>Bezzia</i> complex            | 3           |
|                           |      |               | Chironomidae     | <i>Ablabesmyia janta</i>         | 2           |
|                           |      |               |                  | <i>Apedilum</i> sp.              | 32          |
|                           |      |               |                  | <i>Brillia</i> sp.               | 1           |
|                           |      |               |                  | <i>Cardiocladius</i> sp.         | 2           |
|                           |      |               |                  | <i>Chaetocladius</i> sp.         | 1           |
|                           |      |               |                  | <i>Labrundinia</i> sp.           | 2           |
|                           |      |               |                  | <i>Nanocladius</i> sp.           | 1           |
|                           |      |               |                  | Orthoclaudiinae                  | 1           |
|                           |      |               |                  | <i>Parametriochnemus</i> sp.     | 1           |
|                           |      |               |                  | <i>Phaenopsectra</i> sp.         | 28          |
|                           |      |               |                  | <i>Polypedium</i> sp.            | 2           |
|                           |      |               |                  | <i>Polypedium flavum</i>         | 8           |
|                           |      |               |                  | <i>Polypedium fallax</i>         | 1           |
|                           |      |               |                  | <i>Polypedium illinoense</i>     | 1           |
|                           |      |               |                  | <i>Psectrocladius</i> sp.        | 1           |
|                           |      |               |                  | <i>Pseudochironomus</i> sp.      | 1           |
|                           |      |               |                  | <i>Rheotanytarsus pellucidus</i> | 1           |
|                           |      |               |                  | <i>Stelechomyia perpulchra</i>   | 1           |
|                           |      |               |                  | <i>Telopelopia okoboji</i>       | 2           |
|                           |      |               |                  | <i>Thienemannimyia</i> group sp. | 1           |
|                           |      |               |                  | <i>Pseudolimnophila</i> sp.      | 3           |
|                           |      |               | Tipulidae        | <i>Tipula</i> sp.                | 1           |
|                           |      | Ephemeroptera | Ephemeridae      | <i>Hexagenia limbata</i>         | 1           |
|                           |      |               | Heptageniidae    | <i>Stenonema</i> sp.             | 8           |
|                           |      | Megaloptera   | Corydalidae      | <i>Nigronia serricornis</i>      | 1           |
|                           |      | Odonata       | Aeshnidae        | <i>Boyeria vinosa</i>            | 2           |
|                           |      |               | Cordulegastridae | <i>Epithea</i> sp.               | 4           |
|                           |      |               | Gomphidae        | <i>Gomphus cavillaris</i>        | 1           |
|                           |      | Plecoptera    | Perlidae         | <i>Acroneuria</i> sp.            | 7           |
|                           |      |               |                  | <i>Acroneuria internata</i>      | 1           |
|                           |      |               | Taeniopterygidae | <i>Strophopteryx limata</i>      | 13          |
|                           |      | Trichoptera   | Calamoceratidae  | <i>Anisocentropus pyraloides</i> | 2           |
|                           |      |               | Hydropsychidae   | <i>Cheumatopsyche</i> sp.        | 18          |



|  |  |                   |                |                        |   |
|--|--|-------------------|----------------|------------------------|---|
|  |  |                   |                | Hydropsychidae         | 1 |
|  |  |                   |                | <i>Potamyia flava</i>  | 4 |
|  |  |                   | Leptoceridae   | <i>Nectopsyche</i> sp. | 1 |
|  |  |                   | Philopotamidae | <i>Chimarra</i> sp.    | 4 |
|  |  | Class: Clitellata |                | Oligochaeta            | 6 |



| Sub-ecoregion /Station ID | Ref. | Order          | Family            | Final Identification         | Individuals |
|---------------------------|------|----------------|-------------------|------------------------------|-------------|
| <b>Whooping Creek</b>     |      |                |                   |                              |             |
| HH18                      | Yes  | Basommatophora | Physidae          | <i>Physella</i> sp.          | 1           |
|                           |      | Coleoptera     | Elmidae           | <i>Ancyronyx variegatus</i>  | 42          |
|                           |      |                |                   | <i>Dubiraphia</i> sp.        | 2           |
|                           |      |                |                   | <i>Macronychus glabratus</i> | 3           |
|                           |      |                |                   | <i>Stenelmis</i> sp.         | 7           |
|                           |      | Decapoda       | Cambaridae        | <i>Procambarus</i> sp.       | 3           |
|                           |      | Diptera        | Ceratopogonidae   | <i>Bezzia</i> complex        | 1           |
|                           |      |                | Chironomidae      | <i>Ablabesmyia</i> sp.       | 2           |
|                           |      |                |                   | <i>Ablabesmyia annulata</i>  | 1           |
|                           |      |                |                   | Chironomidae                 | 2           |
|                           |      |                |                   | <i>Clinotanypus</i> sp.      | 2           |
|                           |      |                |                   | <i>Hudsonimyia</i> sp.       | 1           |
|                           |      |                |                   | <i>Parametriochnemus</i> sp. | 1           |
|                           |      |                |                   | <i>Rheocricotopus</i> sp.    | 1           |
|                           |      |                |                   | <i>Stenochironomus</i> sp.   | 4           |
|                           |      |                |                   | <i>Xylotopus</i> par         | 3           |
|                           |      | Ephemeroptera  | Baetidae          | Baetis sp.                   | 2           |
|                           |      |                | Ephemeridae       | <i>Hexagenia limbata</i>     | 20          |
|                           |      |                | Heptageniidae     | <i>Stenonema</i> sp.         | 20          |
|                           |      |                | Isonychiidae      | <i>Isonychia</i> sp.         | 6           |
|                           |      | Isopoda        | Asellidae         | <i>Lirceus fontinalis</i>    | 12          |
|                           |      | Megaloptera    | Corydalidae       | <i>Corydalus cornutus</i>    | 4           |
|                           |      | Odonata        | Calopterygidae    | <i>Hetaerina americana</i>   | 1           |
|                           |      |                | Coenagrionidae    | <i>Argia</i> sp.             | 1           |
|                           |      |                |                   | <i>Ischnura</i> sp.          | 1           |
|                           |      | Plecoptera     | Taeniopterygidae  | <i>Taeniopteryx</i> sp.      | 1           |
|                           |      | Trichoptera    | Hydropsychidae    | <i>Cheumatopsyche</i> sp.    | 63          |
|                           |      |                |                   | <i>Hydropsyche</i> sp.       | 7           |
|                           |      |                | Leptoceridae      | <i>Oecetis inconspicua</i>   | 2           |
|                           |      |                | Philopotamidae    | <i>Chimarra</i> sp.          | 9           |
|                           |      |                | Polycentropodidae | <i>Neureclipsis</i> sp.      | 2           |
|                           |      | Veneroida      | Corbiculidae      | <i>Corbicula fluminea</i>    | 10          |



| Sub-ecoregion /Station ID | Ref. | Order          | Family         | Final Identification             | Individuals |
|---------------------------|------|----------------|----------------|----------------------------------|-------------|
| Rae's Creek               |      |                |                |                                  |             |
| 65c-3                     | No   | Basommatophora | Physidae       | <i>Physella</i> sp.              | 3           |
|                           |      | Coleoptera     | Elmidae        | <i>Ancyronyx variegatus</i>      | 2           |
|                           |      |                |                | <i>Stenelmis</i> sp.             | 1           |
|                           |      |                | Psephenidae    | <i>Psephenus hernicki</i>        | 1           |
|                           |      | Decapoda       | Cambaridae     | Cambarinae                       | 1           |
|                           |      | Diptera        | Chironomidae   | <i>Ablabesmyia</i> sp.           | 1           |
|                           |      |                |                | <i>Ablabesmyia mallochi</i>      | 3           |
|                           |      |                |                | <i>Brillia</i> sp.               | 8           |
|                           |      |                |                | Chironomidae                     | 2           |
|                           |      |                |                | <i>Phaenopsectra</i> sp.         | 2           |
|                           |      |                |                | <i>Polypedilum</i> sp.           | 4           |
|                           |      |                |                | <i>Polypedilum aviceps</i>       | 30          |
|                           |      |                |                | <i>Potthastia</i> sp.            | 1           |
|                           |      |                |                | <i>Rheocricotopus</i> sp.        | 3           |
|                           |      |                |                | <i>Rheocricotopus robacki</i>    | 4           |
|                           |      |                |                | <i>Stenochironomus</i> sp.       | 1           |
|                           |      |                |                | <i>Tanytarsus</i> L.             | 1           |
|                           |      |                |                | <i>Thienemannimyia</i> group sp. | 4           |
|                           |      |                |                | <i>Tribelos</i> sp.              | 2           |
|                           |      |                |                | <i>Tribelos jucundus</i>         | 21          |
|                           |      |                |                |                                  | Simuliidae  |
|                           |      | Ephemeroptera  | Ephemerellidae | <i>Attenella attenuata</i>       | 1           |
|                           |      |                | Heptageniidae  | <i>Stenonema</i> sp.             | 55          |
|                           |      | Megaloptera    | Corydalidae    | <i>Corydalus cornutus</i>        | 1           |
|                           |      | Odonata        | Coenagrionidae | <i>Chromagrion conditum</i>      | 1           |
|                           |      |                |                | Coenagrionidae                   | 2           |
|                           |      | Trichoptera    | Hydropsychidae | <i>Ceratopsyche spama</i>        | 4           |
|                           |      |                |                | <i>Cheumatopsyche</i> sp.        | 7           |
|                           |      |                |                | <i>Hydropsyche</i> sp.           | 3           |
| Class: Clitellata         |      |                | Oligochaeta    | 3                                |             |



| Sub-region / Station ID | Ref. | Order          | Family          | Final Identification                        | Individuals |
|-------------------------|------|----------------|-----------------|---------------------------------------------|-------------|
| <b>Rocky Creek</b>      |      |                |                 |                                             |             |
| 65c-4                   | No   | Basommatophora | Physidae        | <i>Physa</i> sp.                            | 12          |
|                         |      |                | Planorbidae     | Planorbidae                                 | 1           |
|                         |      | Coleoptera     | Elmidae         | <i>Ancyronyx variegatus</i>                 | 2           |
|                         |      |                |                 | <i>Dubiraphia vittata</i>                   | 1           |
|                         |      |                | Sphaeriidae     | Sphaeriidae                                 | 4           |
|                         |      | Decapoda       | Cambaridae      | <i>Procambarus</i> sp.                      | 1           |
|                         |      | Diptera        | Ceratopogonidae | Bezzia complex                              | 2           |
|                         |      |                | Chironomidae    | <i>Ablabesmyia</i> sp.                      | 8           |
|                         |      |                |                 | <i>Ablabesmyia hauberi</i>                  | 5           |
|                         |      |                |                 | <i>Ablabesmyia mallochi</i>                 | 23          |
|                         |      |                |                 | <i>Ablabesmyia peleeensis</i>               | 1           |
|                         |      |                |                 | <i>Apedilum</i> sp.                         | 1           |
|                         |      |                |                 | <i>Chironomus decorus</i>                   | 1           |
|                         |      |                |                 | <i>Conchapelopia</i> sp. (aberrant 6 teeth) | 1           |
|                         |      |                |                 | <i>Dicrotendipes</i> sp.                    | 19          |
|                         |      |                |                 | <i>Dicrotendipes</i> A                      | 13          |
|                         |      |                |                 | <i>Glyptotendipes</i> sp.                   | 1           |
|                         |      |                |                 | <i>Nanocladius</i> sp.                      | 1           |
|                         |      |                |                 | <i>Parachironomus tenuicaudatus</i> complex | 1           |
|                         |      |                |                 | <i>Paratanytarsus</i> sp.                   | 1           |
|                         |      |                |                 | <i>Paratanytarsus</i> D                     | 1           |
|                         |      |                |                 | <i>Paratanytarsus dissimilis</i>            | 2           |
|                         |      |                |                 | <i>Phaenopsectra obediens</i> grp.          | 9           |
|                         |      |                |                 | <i>Phaenopsectra punctipes</i> grp.         | 3           |
|                         |      |                |                 | <i>Polypedium halterale</i>                 | 1           |
|                         |      |                |                 | <i>Polypedium scalaenum</i>                 | 1           |
|                         |      |                |                 | <i>Polypedium tritum</i>                    | 1           |
|                         |      |                |                 | <i>Procladius</i> sp.                       | 2           |
|                         |      |                |                 | <i>Procladius</i> (Holotanypus) sp.         | 1           |
|                         |      |                |                 | <i>Rheotanytarsus exiguus</i> group         | 7           |
|                         |      |                |                 | <i>Rheotanytarsus pellucidus</i>            | 1           |
|                         |      |                |                 | Tribe Tanytarsini                           | 2           |
|                         |      |                |                 | <i>Tanytarsus</i> C                         | 2           |
|                         |      |                |                 | <i>Tanytarsus</i> P                         | 2           |
|                         |      |                |                 | <i>Tanytarsus</i> T                         | 2           |
|                         |      |                |                 | <i>Tanytarsus</i> U                         | 2           |
|                         |      |                |                 | <i>Thienemannimyia</i> group sp.            | 20          |
|                         |      |                |                 | <i>Tribelos atrum</i>                       | 8           |
|                         |      |                |                 | <i>Tribelos fuscicorne</i>                  | 3           |



|  |  |                   |                |                              |    |
|--|--|-------------------|----------------|------------------------------|----|
|  |  |                   |                | <i>Trissopelopia ogemawi</i> | 2  |
|  |  |                   | Tipulidae      | <i>Tipula</i> sp.            | 1  |
|  |  | Heteroptera       | Nepidae        | <i>Ranatra buenoi</i>        | 1  |
|  |  | Odonata           | Calopterygidae | Calopterygidae               | 1  |
|  |  |                   | Coenagrionidae | <i>Argia</i> sp.             | 19 |
|  |  |                   |                | Coenagrionidae               | 3  |
|  |  |                   |                | <i>Enallagma</i> sp.         | 18 |
|  |  |                   |                | <i>Enallagma divagans</i>    | 1  |
|  |  |                   |                | <i>Ischnura</i> sp.          | 2  |
|  |  |                   | Gomphidae      | Gomphidae                    | 2  |
|  |  | Class: Clitellata |                | Oligochaeta                  | 8  |



| Sub-coregion /Station ID | Ref. | Order         | Family            | Final Identification                  | Individuals |
|--------------------------|------|---------------|-------------------|---------------------------------------|-------------|
| <b>Sweetwater Creek</b>  |      |               |                   |                                       |             |
| 65c-8                    | No   | Coleoptera    | Dytiscidae        | <i>Hydroporus</i> sp.                 | 7           |
|                          |      |               | Elmidae           | <i>Stenelmis</i> sp.                  | 2           |
|                          |      | Diptera       | Chironomidae      | <i>Ablabesmyia</i> sp.                | 2           |
|                          |      |               |                   | <i>Ablabesmyia aspera</i>             | 1           |
|                          |      |               |                   | <i>Ablabesmyia mallochi</i>           | 11          |
|                          |      |               |                   | <i>Corynoneura</i> sp.                | 1           |
|                          |      |               |                   | <i>Cricotopus politus</i>             | 1           |
|                          |      |               |                   | <i>Dicrotendipes</i> sp.              | 4           |
|                          |      |               |                   | <i>Gillotia albobiviridis</i>         | 1           |
|                          |      |               |                   | <i>Glyptotendipes</i> B               | 2           |
|                          |      |               |                   | <i>Microtendipes pedellus</i>         | 1           |
|                          |      |               |                   | <i>Nanocladius</i> sp.                | 1           |
|                          |      |               |                   | <i>Orthocladius obumbratus</i>        | 1           |
|                          |      |               |                   | <i>Parametricnismus</i> sp.           | 1           |
|                          |      |               |                   | <i>Phaenopsectra</i> sp.              | 1           |
|                          |      |               |                   | <i>Phaenopsectra obediens</i> grp.    | 10          |
|                          |      |               |                   | <i>Phaenopsectra/Tribelos</i> complex | 5           |
|                          |      |               |                   | <i>Polypedium aviceps</i>             | 4           |
|                          |      |               |                   | <i>Polypedium flavum</i>              | 3           |
|                          |      |               |                   | <i>Rheotanytarsus pellucidus</i>      | 1           |
|                          |      |               |                   | <i>Stenochironomus</i> sp.            | 9           |
|                          |      |               |                   | Tanytopodinae                         | 1           |
|                          |      |               |                   | Tribe Tanytarsini                     | 2           |
|                          |      |               |                   | <i>Tanytarsus</i> sp.                 | 4           |
|                          |      |               |                   | <i>Tanytarsus</i> L                   | 2           |
|                          |      |               |                   | <i>Thienemannimyia</i> group sp.      | 6           |
|                          |      |               |                   | <i>Tribelos fuscicome</i>             | 1           |
|                          |      |               |                   | <i>Tribelos jucundus</i>              | 5           |
|                          |      |               |                   | <i>Unniella multivirga</i>            | 4           |
|                          |      |               | Empididae         | <i>Hemerodromia</i> sp.               | 1           |
|                          |      |               |                   | <i>Rhamphomyia</i> sp.                | 1           |
|                          |      |               | Simuliidae        | <i>Prosimulium</i> sp.                | 41          |
|                          |      |               |                   | <i>Simulium</i> sp.                   | 28          |
|                          |      | Ephemeroptera | Caenidae          | <i>Caenis</i> sp.                     | 1           |
|                          |      |               | Heptageniidae     | <i>Stenonema terminatum</i>           | 3           |
|                          |      | Trichoptera   | Hydropsychidae    | <i>Ceratopsyche spama</i>             | 2           |
|                          |      |               |                   | <i>Cheumatopsyche</i> sp.             | 38          |
|                          |      |               |                   | Hydropsychidae                        | 5           |
|                          |      |               | Leptoceridae      | <i>Oecetis</i> sp.                    | 1           |
|                          |      |               | Polycentropodidae | <i>Cermetina</i> sp.                  | 1           |
|                          |      |               |                   | <i>Polycentropus</i> sp.              | 7           |
|                          |      | Veneroida     | Pisidiidae        | Pisidiidae                            | 2           |



| Sub-ecoregion /Station ID | Ref. | Order      | Family          | Final Identification                      | Individuals |
|---------------------------|------|------------|-----------------|-------------------------------------------|-------------|
| <b>Magtail Branch</b>     |      |            |                 |                                           |             |
| 65c-12                    | No   | Amphipoda  | Talitridae      | <i>Hyalella azteca</i>                    | 2           |
|                           |      | Coleoptera | Curculionidae   | <i>Anchytarsus bicolor</i>                | 1           |
|                           |      |            | Dytiscidae      | <i>Hydaticus</i> sp.                      | 1           |
|                           |      |            |                 | <i>Hydroporus</i> sp.                     | 2           |
|                           |      |            | Elmidae         | <i>Ancyronyx variegatus</i>               | 3           |
|                           |      |            |                 | <i>Stenelmis</i> sp.                      | 1           |
|                           |      | Diptera    | Ceratopogonidae | Bezzia complex                            | 5           |
|                           |      |            | Chironomidae    | <i>Ablabesmyia</i> sp.                    | 2           |
|                           |      |            |                 | <i>Ablabesmyia mallochi</i>               | 3           |
|                           |      |            |                 | Chironominae                              | 1           |
|                           |      |            |                 | <i>Corynoneura</i> sp.                    | 2           |
|                           |      |            |                 | <i>Dicrotendipes</i> sp.                  | 1           |
|                           |      |            |                 | <i>Heterotrissocladius</i>                | 1           |
|                           |      |            |                 | <i>Cladwell/boltoni</i>                   | 1           |
|                           |      |            |                 | <i>Labrundinia</i> sp.                    | 1           |
|                           |      |            |                 | <i>Labrundinia pilosella</i>              | 6           |
|                           |      |            |                 | <i>Larsia</i> sp.                         | 1           |
|                           |      |            |                 | <i>Micropsectra D</i>                     | 1           |
|                           |      |            |                 | <i>Microtendipes rydalensis</i>           | 1           |
|                           |      |            |                 | <i>Neozavrelia</i> sp.                    | 1           |
|                           |      |            |                 | <i>Paralauterborniella nigrohalterale</i> | 2           |
|                           |      |            |                 | <i>Parametriochnemus</i> sp.              | 1           |
|                           |      |            |                 | <i>Paratendipes subaequalis</i>           | 1           |
|                           |      |            |                 | <i>Phaenopsectra obediens</i> grp.        | 3           |
|                           |      |            |                 | <i>Phaenopsectra punctipes</i> grp.       | 1           |
|                           |      |            |                 | <i>Polypedilum aviceps</i>                | 1           |
|                           |      |            |                 | <i>Polypedilum laetum</i>                 | 1           |
|                           |      |            |                 | <i>Psilometriochnemus triannulatus</i>    | 1           |
|                           |      |            |                 | <i>Rheotanytarsus</i> sp.                 | 1           |
|                           |      |            |                 | <i>Rheotanytarsus exiguus</i> grp.        | 7           |
|                           |      |            |                 | <i>Rheotanytarsus pellucidus</i>          | 1           |
|                           |      |            |                 | <i>Stempellinella</i> sp.                 | 1           |
|                           |      |            |                 | <i>Stempellinella A</i>                   | 3           |
|                           |      |            |                 | <i>Stempellinella B</i>                   | 1           |
|                           |      |            |                 | <i>Stempellinella leptocelloides</i>      | 2           |
|                           |      |            |                 | <i>Stenochironomus</i> sp.                | 6           |
|                           |      |            |                 | Tanypodinae                               | 1           |
|                           |      |            |                 | Tribe Tanytarsini                         | 3           |
|                           |      |            |                 | <i>Tanytarsus</i> sp.                     | 7           |
|                           |      |            |                 | <i>Tanytarsus A</i>                       | 2           |
|                           |      |            |                 | <i>Tanytarsus L</i>                       | 3           |



|  |               |                  |                                         |                                     |    |
|--|---------------|------------------|-----------------------------------------|-------------------------------------|----|
|  |               |                  |                                         | <i>Tanytarsus M</i>                 | 1  |
|  |               |                  |                                         | <i>Tanytarsus S</i>                 | 1  |
|  |               |                  |                                         | <i>Tanytarsus T</i>                 | 2  |
|  |               |                  |                                         | <i>Tanytarsus W</i>                 | 1  |
|  |               |                  |                                         | <i>Thienemannimyia</i><br>group sp. | 12 |
|  |               |                  |                                         | <i>Tribelos jucundus</i>            | 2  |
|  |               |                  |                                         | <i>Unniella multivirga</i>          | 1  |
|  |               |                  | Dixidae                                 | <i>Dixella indiana</i>              | 2  |
|  |               |                  | Empididae                               | <i>Hemerodromia</i> sp.             | 2  |
|  |               |                  | Tabanidae                               | <i>Tabanus</i> sp.                  | 2  |
|  |               |                  | Tipulidae                               | <i>Pseudolimnophila</i> sp.         | 2  |
|  |               |                  |                                         | <i>Tipula</i> sp.                   | 1  |
|  | Ephemeroptera | Ephemerellidae   | <i>Eurylophella bicolor</i>             | 4                                   |    |
|  |               | Ephemeridae      | <i>Hexagenia limbata</i>                | 1                                   |    |
|  |               | Heptageniidae    | <i>Stenonema</i><br><i>terminatum</i>   | 38                                  |    |
|  |               | Leptophlebiidae  | <i>Paraleptophlebia</i> sp.             | 48                                  |    |
|  |               | Potamanthidae    | <i>Potamanthus</i><br><i>distinctus</i> | 4                                   |    |
|  | Odonata       | Calopterygidae   | <i>Calopteryx</i> sp.                   | 1                                   |    |
|  |               | Coenagrionidae   | <i>Argia</i> sp.                        | 2                                   |    |
|  |               | Corduliidae      | <i>Macromia</i> sp.                     | 1                                   |    |
|  |               | Gomphidae        | Gomphidae                               | 4                                   |    |
|  |               |                  | <i>Progomphus</i> sp.                   | 4                                   |    |
|  |               | Libellulidae     | <i>Brachymesia gravida</i>              | 1                                   |    |
|  | Plecoptera    | Perlidae         | <i>Eccoptura xanthenes</i>              | 1                                   |    |
|  |               |                  | <i>Perlesta</i> sp.                     | 1                                   |    |
|  |               |                  | <i>Perlinaella drymo</i>                | 1                                   |    |
|  |               | Periodidae       | <i>Isoperla marlynia</i>                | 2                                   |    |
|  | Trichoptera   | Hydropsychidae   | <i>Cheumatopsyche</i> sp.               | 4                                   |    |
|  |               | Lepidostomatidae | <i>Lepidostoma</i> sp.                  | 1                                   |    |
|  |               | Leptoceridae     | <i>Ceraclea diluta</i>                  | 1                                   |    |
|  |               |                  | Leptoceridae                            | 1                                   |    |
|  |               |                  | <i>Oecetis</i> sp.                      | 1                                   |    |
|  |               | Limnephilidae    | <i>Pycnopsyche</i> sp.                  | 2                                   |    |
|  |               | Molannidae       | <i>Molanna tryphena</i>                 | 2                                   |    |
|  | Veneroida     | Pisidiidae       | <i>Sphaerium</i> sp.                    | 1                                   |    |



| Sub-ecoregion /Station ID | Ref. | Order      | Family          | Final Identification                             | Individuals |
|---------------------------|------|------------|-----------------|--------------------------------------------------|-------------|
| <b>Deep Creek</b>         |      |            |                 |                                                  |             |
| 65c-40                    | No   | Coleoptera | Curculionidae   | <i>Anchytarsus bicolor</i>                       | 4           |
|                           |      |            | Dytiscidae      | <i>Liodessus</i> sp.                             | 1           |
|                           |      |            | Elmidae         | <i>Ancyronyx variegatus</i>                      | 2           |
|                           |      |            |                 | <i>Stenelmis</i> sp.                             | 8           |
|                           |      |            |                 | <i>Stenelmis antennalis</i>                      | 1           |
|                           |      | Decapoda   | Cambaridae      | Cambarinae                                       | 4           |
|                           |      |            |                 | <i>Procambarus gibbus</i>                        | 2           |
|                           |      |            |                 | <i>Bezzia</i> complex                            | 3           |
|                           |      | Diptera    | Ceratopogonidae | <i>Dasyhelea</i> sp.                             | 3           |
|                           |      |            |                 | <i>Ablabesmyia mallochii</i>                     | 1           |
|                           |      |            |                 | <i>Ablabesmyia simpsoni</i>                      | 1           |
|                           |      |            | Chironomidae    | Chironominae                                     | 1           |
|                           |      |            |                 | <i>Clinotanypus</i> sp.                          | 2           |
|                           |      |            |                 | <i>Corynoneura</i> sp.                           | 1           |
|                           |      |            |                 | <i>Djalmabatista pulcher</i> variant (5 toothed) | 1           |
|                           |      |            |                 | <i>Georthocladus</i> sp.                         | 1           |
|                           |      |            |                 | <i>Hamischia</i> Complex D                       | 3           |
|                           |      |            |                 | <i>Labrundinia</i> sp.                           | 2           |
|                           |      |            |                 | <i>Manoa</i> sp.                                 | 6           |
|                           |      |            |                 | <i>Microtendipes</i> sp.                         | 2           |
|                           |      |            |                 | <i>Microtendipes pedellus</i> grp.               | 4           |
|                           |      |            |                 | <i>Microtendipes rydalensis</i>                  | 1           |
|                           |      |            |                 | <i>Nanocladius</i> sp.                           | 4           |
|                           |      |            |                 | <i>Nilothauma</i> sp.                            | 1           |
|                           |      |            |                 | Orthoclaadiinae                                  | 1           |
|                           |      |            |                 | <i>Parametricnemus</i> sp.                       | 1           |
|                           |      |            |                 | <i>Paraphaenocladus</i> sp.                      | 1           |
|                           |      |            |                 | <i>Paratanytarsus</i> sp.                        | 1           |
|                           |      |            |                 | <i>Phaenopsectra</i> sp.                         | 2           |
|                           |      |            |                 | <i>Phaenopsectra obediens</i> grp.               | 2           |
|                           |      |            |                 | <i>Phaenopsectra punctipes</i> grp.              | 1           |
|                           |      |            |                 | <i>Polypedilum flavum</i>                        | 1           |
|                           |      |            |                 | <i>Procladius</i> sp.                            | 1           |
|                           |      |            |                 | <i>Procladius (Holotanypus)</i> sp.              | 1           |
|                           |      |            |                 | <i>Pseudorthocladus</i> sp.                      | 1           |
|                           |      |            |                 | <i>Rheocricotopus robacki</i>                    | 5           |
|                           |      |            |                 | <i>Stelechomyia perpulchra</i>                   | 1           |
|                           |      |            |                 | <i>Stempellinella</i> sp.                        | 1           |
|                           |      |            |                 | <i>Stempellinella A</i>                          | 6           |
|                           |      |            |                 | <i>Stempellinella leptocelloides</i>             | 2           |
|                           |      |            |                 | <i>Stenochironomus</i> sp.                       | 6           |
|                           |      |            |                 | Tanypodinae                                      | 1           |
|                           |      |            |                 | <i>Tanytarsus O</i>                              | 1           |



|  |  |               |                   |                                            |    |
|--|--|---------------|-------------------|--------------------------------------------|----|
|  |  |               |                   | <i>Telopelopia okoboji</i>                 | 2  |
|  |  |               |                   | <i>Thienemannimyia</i><br>group sp.        | 75 |
|  |  |               |                   | <i>Unniella multivirga</i>                 | 7  |
|  |  |               |                   | <i>Xenochironomus</i><br><i>xenolabis</i>  | 1  |
|  |  |               | Simuliidae        | <i>Simulium</i> sp.                        | 7  |
|  |  |               | Tipulidae         | <i>Hexatoma</i> sp.                        | 1  |
|  |  |               |                   | Tipulidae                                  | 1  |
|  |  | Ephemeroptera | Ephemeridae       | <i>Hexagenia limbata</i>                   | 1  |
|  |  |               | Heptageniidae     | Heptageniidae                              | 3  |
|  |  |               | Isonychiidae      | <i>Isonychia</i> sp.                       | 1  |
|  |  |               | Leptophlebiidae   | Leptophlebiidae                            | 6  |
|  |  |               | Polymitarcyidae   | <i>Ephoron leukon</i>                      | 1  |
|  |  | Megaloptera   | Corydalidae       | <i>Nigronia semicomis</i>                  | 1  |
|  |  | Odonata       | Aeshnidae         | <i>Boyeria vinosa</i>                      | 1  |
|  |  |               | Calopterygidae    | <i>Calopteryx</i> sp.                      | 1  |
|  |  |               |                   | <i>Calopteryx maculata</i>                 | 1  |
|  |  |               | Coenagrionidae    | <i>Argia</i> sp.                           | 1  |
|  |  |               | Corduliidae       | <i>Neurocordulia</i><br><i>alabamensis</i> | 1  |
|  |  |               |                   | <i>Somatochlora linearis</i>               | 1  |
|  |  |               | Macromiidae       | <i>Macromia taeniolata</i>                 | 1  |
|  |  | Plecoptera    | Chloroperlidae    | Chloroperlidae                             | 1  |
|  |  |               | Leuctridae        | <i>Leuctra</i> sp.                         | 1  |
|  |  |               | Nemouridae        | Nemouridae                                 | 1  |
|  |  |               | Perlidae          | <i>Acroneuria lycorias</i>                 | 1  |
|  |  |               |                   | <i>Beloneuria</i> sp.                      | 1  |
|  |  |               |                   | Perlidae                                   | 1  |
|  |  |               | Taeniopterygidae  | Taeniopterygidae                           | 2  |
|  |  | Trichoptera   | Brachycentridae   | <i>Brachycentrus chelatus</i>              | 1  |
|  |  |               | Calamoceratidae   | <i>Anisocentropus</i><br><i>pyraloides</i> | 4  |
|  |  |               | Hydropsychidae    | <i>Hydropsyche scalaris</i>                | 6  |
|  |  |               |                   | Hydropsychidae                             | 1  |
|  |  |               | Leptoceridae      | Leptoceridae                               | 1  |
|  |  |               | Philopotamidae    | <i>Chimarra</i> sp.                        | 4  |
|  |  |               | Polycentropodidae | <i>Neureclipsis</i> sp.                    | 5  |
|  |  |               |                   | Polycentropodidae                          | 1  |



| Sub-ecoregion / Station ID | Ref. | Order             | Family          | Final Identification             | Individuals |
|----------------------------|------|-------------------|-----------------|----------------------------------|-------------|
| <b>Lanahassee Creek</b>    |      |                   |                 |                                  |             |
| 65c-80                     | Yes  | Amphipoda         | Talitridae      | <i>Hyalella azteca</i>           | 5           |
|                            |      | Architaenioglossa | Viviparidae     | <i>Campeloma limum</i>           | 3           |
|                            |      | Coleoptera        | Elmidae         | <i>Ancyronyx variegatus</i>      | 2           |
|                            |      |                   |                 | <i>Macronychus glabratus</i>     | 1           |
|                            |      | Decapoda          | Cambaridae      | Cambarinae                       | 1           |
|                            |      | Diptera           | Ceratopogonidae | <i>Bezzia complex</i>            | 2           |
|                            |      |                   | Chironomidae    | <i>Ablabesmyia</i> sp.           | 3           |
|                            |      |                   |                 | <i>Ablabesmyia mallochi</i>      | 5           |
|                            |      |                   |                 | <i>Apedilum</i> sp.              | 56          |
|                            |      |                   |                 | Chironomidae                     | 2           |
|                            |      |                   |                 | <i>Clinotanytus</i> sp.          | 4           |
|                            |      |                   |                 | <i>Dicortendipes</i> sp.         | 3           |
|                            |      |                   |                 | <i>Hudsonimyia</i> sp.           | 1           |
|                            |      |                   |                 | <i>Hydrobaenus</i> sp.           | 2           |
|                            |      |                   |                 | <i>Larsia</i> sp.                | 1           |
|                            |      |                   |                 | <i>Monopelopia</i> sp.           | 1           |
|                            |      |                   |                 | <i>Monopelopia boliekae</i>      | 1           |
|                            |      |                   |                 | <i>Monopelopia tillandsia</i>    | 3           |
|                            |      |                   |                 | <i>Natarsia</i> sp.              | 1           |
|                            |      |                   |                 | <i>Paramerina</i> sp.            | 1           |
|                            |      |                   |                 | <i>Parametriochnemus</i> sp.     | 7           |
|                            |      |                   |                 | <i>Paratanytarsus</i> sp.        | 5           |
|                            |      |                   |                 | <i>Phaenopsectra</i> sp.         | 17          |
|                            |      |                   |                 | <i>Polypedilum</i> sp.           | 2           |
|                            |      |                   |                 | <i>Polypedilum aviceps</i>       | 4           |
|                            |      |                   |                 | <i>Polypedilum flavum</i>        | 13          |
|                            |      |                   |                 | <i>Polypedilum tritum</i>        | 5           |
|                            |      |                   |                 | <i>Procladius</i> sp.            | 2           |
|                            |      |                   |                 | <i>Pseudorthocladius</i> sp.     | 1           |
|                            |      |                   |                 | <i>Rheotanytarsus</i> sp.        | 5           |
|                            |      |                   |                 | <i>Stenochironomus</i> sp.       | 2           |
|                            |      |                   |                 | <i>Tanytarsus</i> sp.            | 10          |
|                            |      |                   |                 | <i>Thienemannimyia</i> group sp. | 18          |
|                            |      |                   |                 | <i>Xestochironomus</i> sp.       | 1           |
|                            |      |                   | Ephydriidae     | <i>Hydrellia</i> sp.             | 1           |
|                            |      | Ephemeroptera     | Ephemeridae     | <i>Hexagenia limbata</i>         | 3           |
|                            |      |                   | Heptageniidae   | <i>Stenonema</i> sp.             | 3           |
|                            |      | Megaloptera       | Sialidae        | <i>Sialis mohri</i>              | 1           |
|                            |      | Neotaenioglossa   | Pleuroceridae   | <i>Elimia</i> sp.                | 1           |
|                            |      |                   |                 | <i>Pleurocera</i> sp.            | 1           |



|  |  |                   |                   |                                  |   |
|--|--|-------------------|-------------------|----------------------------------|---|
|  |  | Odonata           | Coenagrionidae    | Coenagrionidae                   | 4 |
|  |  | Plecoptera        | Perlidae          | <i>Acroneuria</i> sp.            | 2 |
|  |  |                   | Taeniopterygidae  | <i>Strophopteryx</i> sp.         | 2 |
|  |  | Trichoptera       | Calamoceratidae   | <i>Anisocentropus pyraloides</i> | 3 |
|  |  |                   | Hydropsychidae    | <i>Cheumatopsyche</i> sp.        | 1 |
|  |  |                   |                   | <i>Potamyia flava</i>            | 1 |
|  |  |                   | Leptoceridae      | <i>Leptocerus americanus</i>     | 1 |
|  |  |                   | Limnephilidae     | <i>Hydatophylax argus</i>        | 3 |
|  |  |                   | Polycentropodidae | <i>Neureclipsis</i> sp.          | 4 |
|  |  |                   |                   | <i>Nyctiophylax</i> sp.          | 1 |
|  |  |                   |                   | <i>Polycentropus</i> sp.         | 7 |
|  |  |                   |                   | Nemata                           | 6 |
|  |  | Class: Clitellata |                   | Oligochaeta                      | 5 |



| Sub-ecoregion /Station ID | Ref. | Order      | Family          | Final Identification                  | Individuals |
|---------------------------|------|------------|-----------------|---------------------------------------|-------------|
| <b>Hichitee Creek</b>     |      |            |                 |                                       |             |
| 65c-88                    | No   | Coleoptera | Elmidae         | <i>Stenelmis</i> sp.                  | 2           |
|                           |      | Decapoda   | Cambaridae      | Cambarinae                            | 9           |
|                           |      | Diptera    | Ceratopogonidae | <i>Bezzia</i> complex                 | 13          |
|                           |      |            | Chironomidae    | <i>Ablabesmyia</i> sp.                | 6           |
|                           |      |            |                 | <i>Ablabesmyia mallochi</i>           | 10          |
|                           |      |            |                 | <i>Brillia flavifrons</i>             | 1           |
|                           |      |            |                 | <i>Chironomus ochreateus</i>          | 1           |
|                           |      |            |                 | <i>Corynoneura</i> sp.                | 1           |
|                           |      |            |                 | <i>Gillotia albobivindus</i>          | 2           |
|                           |      |            |                 | <i>Goeldichironomus</i> sp.           | 1           |
|                           |      |            |                 | <i>Larsia</i> sp.                     | 1           |
|                           |      |            |                 | Orthoclaudiinae                       | 1           |
|                           |      |            |                 | <i>Paramerina</i> sp.                 | 2           |
|                           |      |            |                 | <i>Phaenopsectra obediens</i>         | 18          |
|                           |      |            |                 | <i>Phaenopsectra/Tribelos</i> complex | 2           |
|                           |      |            |                 | <i>Polypedium A</i>                   | 3           |
|                           |      |            |                 | <i>Polypedium flavum</i>              | 21          |
|                           |      |            |                 | <i>Polypedium halterale</i>           | 4           |
|                           |      |            |                 | <i>Polypedium illinoense</i>          | 2           |
|                           |      |            |                 | <i>Polypedium scalaenum</i>           | 20          |
|                           |      |            |                 | <i>Reomyia</i> sp.                    | 1           |
|                           |      |            |                 | <i>Rheocricotopus</i> sp.             | 6           |
|                           |      |            |                 | <i>Rheocricotopus robacki</i>         | 2           |
|                           |      |            |                 | <i>Rheotanytarsus</i> sp.             | 1           |
|                           |      |            |                 | <i>Rheotanytarsus exiguus</i> group   | 1           |
|                           |      |            |                 | <i>Rheotanytarsus pellucidus</i>      | 2           |
|                           |      |            |                 | <i>Robackia claviger</i>              | 1           |
|                           |      |            |                 | <i>Stelechomyia perpulchra</i>        | 3           |
|                           |      |            |                 | <i>Stempellinella</i> sp.             | 1           |
|                           |      |            |                 | <i>Stempellinella A</i>               | 1           |
|                           |      |            |                 | <i>Stempellinella leptocelloides</i>  | 1           |
|                           |      |            |                 | <i>Stenochironomus</i> sp.            | 3           |
|                           |      |            |                 | Tanypodinae                           | 1           |
|                           |      |            |                 | <i>Tanytarsus</i> sp.                 | 4           |
|                           |      |            |                 | <i>Tanytarsus C</i>                   | 1           |
|                           |      |            |                 | <i>Tanytarsus O</i>                   | 1           |
|                           |      |            |                 | <i>Tanytarsus T</i>                   | 2           |
|                           |      |            |                 | <i>Tanytarsus U</i>                   | 1           |
|                           |      |            |                 | <i>Thienemannimyia</i> group sp.      | 9           |
|                           |      |            |                 | <i>Tribelos</i> sp.                   | 1           |
|                           |      |            |                 | <i>Tribelos jucundus</i>              | 3           |
|                           |      |            |                 | <i>Trissopelopia ogemawi</i>          | 1           |
|                           |      |            | Empididae       | <i>Hemerodromia</i> sp.               | 4           |
|                           |      |            | Simuliidae      | <i>Simulium</i> sp.                   | 1           |



|  |  |                   |                           |    |
|--|--|-------------------|---------------------------|----|
|  |  | Tipulidae         | <i>Hexatoma</i> sp.       | 1  |
|  |  |                   | <i>Limnophila</i> sp.     | 2  |
|  |  |                   | Tipulidae                 | 3  |
|  |  | Ephemeroptera     | Caenidae                  | 1  |
|  |  |                   | Ephemerellidae            | 3  |
|  |  |                   | Ephemeridae               | 11 |
|  |  |                   | Heptageniidae             | 4  |
|  |  |                   | Tricorythidae             | 1  |
|  |  | Heteroptera       | Gerridae                  | 1  |
|  |  | Megaloptera       | Corydalidae               | 1  |
|  |  |                   | <i>Nigronia semicomis</i> | 1  |
|  |  | Odonata           | Coenagrionidae            | 2  |
|  |  |                   | Libellulidae              | 1  |
|  |  | Plecoptera        | Perlidae                  | 7  |
|  |  | Trichoptera       | Hydropsychidae            | 2  |
|  |  |                   | Leptoceridae              | 3  |
|  |  | Class: Clitellata |                           | 1  |
|  |  |                   | Oligochaeta               |    |



| Sub-ecoregion /Station ID | Ref. | Order       | Family          | Final Identification      | Individuals   |               |
|---------------------------|------|-------------|-----------------|---------------------------|---------------|---------------|
| Hollis Creek              |      |             |                 |                           |               |               |
| 65c-89                    | Yes  | Coleoptera  | Elmidae         | Ancyronyx variegatus      | 1             |               |
|                           |      |             |                 | Dubiraphia sp.            | 1             |               |
|                           |      |             |                 | Macronychus glabratus     | 1             |               |
|                           |      |             |                 | Stenelmis sp.             | 3             |               |
|                           |      | Decapoda    | Cambaridae      | Cambarinae                | 5             |               |
|                           |      |             | Ceratopogonidae | Bezzia complex            | 2             |               |
|                           |      | Diptera     | Chironomidae    | Ablabesmyia sp.           | 7             |               |
|                           |      |             |                 | Ablabesmyia rhamphe grp.  | 2             |               |
|                           |      |             |                 | Apedilum sp.              | 16            |               |
|                           |      |             |                 | Chironomidae              | 3             |               |
|                           |      |             |                 | Clinotanypus sp.          | 1             |               |
|                           |      |             |                 | Conchapelopia sp.         | 1             |               |
|                           |      |             |                 | Doithrix sp.              | 1             |               |
|                           |      |             |                 | Georthocladius sp.        | 3             |               |
|                           |      |             |                 | Helopelopia sp.           | 6             |               |
|                           |      |             |                 | Labrundinia sp.           | 2             |               |
|                           |      |             |                 | Larsia sp.                | 1             |               |
|                           |      |             |                 | Parametrioctenus sp.      | 1             |               |
|                           |      |             |                 | Phaenopsectra sp.         | 40            |               |
|                           |      |             |                 | Polypedilum fallax        | 1             |               |
|                           |      |             |                 | Rheotanytarsus sp.        | 1             |               |
|                           |      |             |                 | Stelechomyia perpulchra   | 3             |               |
|                           |      |             |                 | Stenochironomus sp.       | 5             |               |
|                           |      |             |                 | Tanypodinae               | 1             |               |
|                           |      |             |                 | Tanytarsus sp.            | 4             |               |
|                           |      |             |                 | Thienemannimyia group sp. | 47            |               |
|                           |      |             |                 | Xestochironomus sp.       | 1             |               |
|                           |      |             |                 | Xylotopus par             | 1             |               |
|                           |      |             |                 | Simuliidae                | Simulium sp.  | 2             |
|                           |      |             |                 | Tipulidae                 | Tipula sp.    | 1             |
|                           |      |             |                 | Ephemeroptera             | Heptageniidae | Stenonema sp. |
|                           |      | Megaloptera | Corydalidae     | Nigronia sericomis        | 1             |               |
|                           |      | Odonata     | Calopterygidae  | Calopteryx sp.            | 2             |               |
|                           |      |             | Coenagrionidae  | Coenagrionidae            | 4             |               |
|                           |      |             | Corduliidae     | Neurocordulia sp.         | 3             |               |
|                           |      |             | Gomphidae       | Dromogomphus spinosus     | 1             |               |
|                           |      | Plecoptera  | Perlidae        | Acroneuria lycorias       | 2             |               |
|                           |      |             |                 | Perlinaella sp.           | 2             |               |
|                           |      | Trichoptera | Calamoceratidae | Anisocentropus pyraloides | 1             |               |
|                           |      |             | Hydropsychidae  | Cheumatopsyche sp.        | 1             |               |
|                           |      |             |                 | Macrostemum sp.           | 8             |               |
|                           |      |             |                 | Oligochaeta               |               | 3             |



| Sub-ecoregion /Station ID | Ref. | Order                  | Family                   | Final Identification               | Individuals    |                             |   |
|---------------------------|------|------------------------|--------------------------|------------------------------------|----------------|-----------------------------|---|
| Whitewater Creek          |      |                        |                          |                                    |                |                             |   |
| HH24                      | Yes  | Coleoptera             | Elmidae                  | Elmidae                            | 4              |                             |   |
|                           |      |                        | Psephenidae              | <i>Ectopria</i> sp.                | 2              |                             |   |
|                           |      | Diptera                | Chironomidae             | <i>Ablabesmyia</i>                 | 1              |                             |   |
|                           |      |                        |                          | <i>Ablabesmyia mallochi</i>        | 1              |                             |   |
|                           |      |                        |                          | <i>Apedilum</i> sp.                | 29             |                             |   |
|                           |      |                        |                          | Chironomidae                       | 3              |                             |   |
|                           |      |                        |                          | <i>Conchapelopia</i> sp.           | 14             |                             |   |
|                           |      |                        |                          | <i>Hamischia</i> Complex D         | 1              |                             |   |
|                           |      |                        |                          | <i>Helopelopia</i> sp.             | 1              |                             |   |
|                           |      |                        |                          | <i>Heterotrissocladius</i> C       | 1              |                             |   |
|                           |      |                        |                          | <i>Manoa</i> sp.                   | 4              |                             |   |
|                           |      |                        |                          | <i>Microtendipes rydalensis</i>    | 4              |                             |   |
|                           |      |                        |                          | <i>Parametrioctenemus</i> sp.      | 2              |                             |   |
|                           |      |                        |                          | <i>Paratanytarsus</i> sp.          | 7              |                             |   |
|                           |      |                        |                          | <i>Phaenopsectra</i> sp.           | 6              |                             |   |
|                           |      |                        |                          | <i>Polypedilum</i> sp.             | 1              |                             |   |
|                           |      |                        |                          | <i>Polypedilum aviceps</i>         | 6              |                             |   |
|                           |      |                        |                          | <i>Polypedilum flavum</i>          | 23             |                             |   |
|                           |      |                        |                          | <i>Polypedilum halterale</i>       | 1              |                             |   |
|                           |      |                        |                          | <i>Polypedilum scalaenum</i>       | 1              |                             |   |
|                           |      |                        |                          | <i>Procladius</i> sp.              | 2              |                             |   |
|                           |      |                        |                          | <i>Rheocricotopus</i> sp.          | 3              |                             |   |
|                           |      |                        |                          | <i>Rheocricotopus tuberculatus</i> | 1              |                             |   |
|                           |      |                        |                          | <i>Rheotanytarsus</i> sp.          | 6              |                             |   |
|                           |      |                        |                          | Tanypodinae                        | 2              |                             |   |
|                           |      |                        |                          | <i>Tanytarsus</i> sp.              | 6              |                             |   |
|                           |      |                        |                          | <i>Tanytarsus M</i>                | 2              |                             |   |
|                           |      |                        |                          | <i>Telopelopia okoboji</i>         | 1              |                             |   |
|                           |      |                        |                          | <i>Thienemannimyia</i> group sp.   | 11             |                             |   |
|                           |      |                        |                          | <i>Zavrelia</i> sp.                | 1              |                             |   |
|                           |      |                        |                          | <i>Simulium</i> sp.                | 4              |                             |   |
|                           |      |                        |                          | Ephemeroptera                      | Ephemerellidae | <i>Eurylophella bicolor</i> | 1 |
|                           |      |                        |                          |                                    | Ephemeridae    | <i>Hexagenia limbata</i>    | 2 |
|                           |      |                        |                          | Megaloptera                        | Corydalidae    | <i>Nigronia serricornis</i> | 2 |
|                           |      |                        |                          | Odonata                            | Coenagrionidae | Coenagrionidae              | 1 |
|                           |      |                        |                          |                                    | Corduliidae    | Corduliidae                 | 1 |
|                           |      |                        |                          |                                    | Gomphidae      | Gomphidae                   | 1 |
|                           |      |                        |                          | Plecoptera                         | Perlidae       | <i>Acroneuria</i> sp.       | 1 |
|                           |      | <i>Agneta capitata</i> | 2                        |                                    |                |                             |   |
|                           |      | Trichoptera            | Calamoceratidae          | <i>Anisocentropus pyraloides</i>   | 1              |                             |   |
|                           |      |                        |                          |                                    |                |                             |   |
|                           |      |                        | Hydropsychidae           | <i>Cheumatopsyche</i> sp.          | 7              |                             |   |
|                           |      |                        |                          | <i>Hydropsyche</i> sp.             | 19             |                             |   |
|                           |      |                        | Leptoceridae             | <i>Triaenodes</i> new sps. A?      | 2              |                             |   |
|                           |      |                        | Philopotamidae           | <i>Chimarra</i> sp.                | 21             |                             |   |
|                           |      |                        | Polycentropodidae        | <i>Neureclipsis</i> sp.            | 6              |                             |   |
|                           |      |                        | <i>Polycentropus</i> sp. | 3                                  |                |                             |   |
|                           |      | Class: Clitellata      |                          |                                    | Oligochaeta    | 3                           |   |



| Sub-ecoregion /Station ID | Ref. | Order         | Family            | Final Identification             | Individuals |
|---------------------------|------|---------------|-------------------|----------------------------------|-------------|
| <b>Pine Knot Creek</b>    |      |               |                   |                                  |             |
| HH25                      | Yes  | Coleoptera    | Elmidae           | <i>Gonielmis dietrichi</i>       | 2           |
|                           |      |               |                   | <i>Macronychus glabratus</i>     | 5           |
|                           |      |               |                   | <i>Promoresia tardella</i>       | 2           |
|                           |      |               |                   | <i>Stenelmis</i> sp.             | 3           |
|                           |      |               | Gyrinidae         | <i>Dineutus</i> sp.              | 1           |
|                           |      |               | Psephenidae       | <i>Ectopria</i> sp.              | 2           |
|                           |      | Diptera       | Ceratopogonidae   | <i>Bezzia</i> complex            | 3           |
|                           |      |               | Chironomidae      | <i>Ablabesmyia mallochi</i>      | 1           |
|                           |      |               |                   | <i>Ablabesmyia rhampe</i> grp.   | 2           |
|                           |      |               |                   | <i>Apedilum</i> sp.              | 23          |
|                           |      |               |                   | <i>Cladotanytarsus</i> sp.       | 1           |
|                           |      |               |                   | <i>Georthocladius</i> sp.        | 5           |
|                           |      |               |                   | <i>Paratanytarsus</i> sp.        | 15          |
|                           |      |               |                   | <i>Phaenopsectra</i> sp.         | 34          |
|                           |      |               |                   | <i>Polypedilum aviceps</i>       | 1           |
|                           |      |               |                   | <i>Stelechomyia perpulchra</i>   | 2           |
|                           |      |               |                   | <i>Stenochironomus</i> sp.       | 3           |
|                           |      |               |                   | <i>Thienemannimyia</i> group sp. | 1           |
|                           |      |               | Simuliidae        | <i>Simulium</i> sp.              | 4           |
|                           |      |               | Tipulidae         | <i>Dicranota</i> sp.             | 1           |
|                           |      | Ephemeroptera | Heptageniidae     | <i>Stenonema</i> sp.             | 10          |
|                           |      | Megaloptera   | Corydalidae       | <i>Nigronia serricornis</i>      | 1           |
|                           |      | Odonata       | Coenagrionidae    | Coenagrionidae                   | 2           |
|                           |      |               | Cordulegastridae  | <i>Epitheca</i> sp.              | 7           |
|                           |      | Plecoptera    | Perlidae          | <i>Acroneuria</i> sp.            | 5           |
|                           |      |               |                   | Perlidae                         | 1           |
|                           |      |               | Taeniopterygidae  | <i>Strophopteryx fasciata</i>    | 3           |
|                           |      |               |                   | <i>Strophopteryx limata</i>      | 17          |
|                           |      | Trichoptera   | Brachycentridae   | <i>Brachycentrus</i> sp.         | 3           |
|                           |      |               | Calamoceratidae   | <i>Anisocentropus pyraloides</i> | 1           |
|                           |      |               | Hydropsychidae    | <i>Arctopsyche</i> sp.           | 2           |
|                           |      |               |                   | <i>Potamyia flava</i>            | 5           |
|                           |      |               | Leptoceridae      | <i>Mystacides sepulchralis</i>   | 8           |
|                           |      |               | Philopotamidae    | <i>Chimarra</i> sp.              | 1           |
|                           |      |               | Polycentropodidae | <i>Neureclipsis</i> sp.          | 5           |



| Sub-ecoregion /Station ID | Ref. | Order       | Family            | Final Identification             | Individuals         |                      |   |
|---------------------------|------|-------------|-------------------|----------------------------------|---------------------|----------------------|---|
| Shoal Creek               |      |             |                   |                                  |                     |                      |   |
| HH26                      | Yes  | Coleoptera  | Dytiscidae        | <i>Liodes</i> sp.                | 1                   |                      |   |
|                           |      |             | Elmidae           | <i>Macronychus glabratus</i>     | 5                   |                      |   |
|                           |      |             |                   | <i>Microcyloepus pusillus</i>    | 3                   |                      |   |
|                           |      |             |                   | <i>Optioservus</i> sp.           | 1                   |                      |   |
|                           |      |             |                   | <i>Promoresia elegans</i>        | 1                   |                      |   |
|                           |      |             |                   | <i>Stenelmis</i> sp.             | 3                   |                      |   |
|                           |      |             | Psephenidae       | <i>Ectopria</i> sp.              | 1                   |                      |   |
|                           |      | Decapoda    | Cambaridae        | Cambarinae                       | 4                   |                      |   |
|                           |      | Diptera     | Chironomidae      | <i>Ablabesmyia mallochi</i>      | 7                   |                      |   |
|                           |      |             |                   | <i>Ablabesmyia rhamphe</i> grp.  | 1                   |                      |   |
|                           |      |             |                   | <i>Apedilum</i> sp.              | 39                  |                      |   |
|                           |      |             |                   | Chironomidae                     | 1                   |                      |   |
|                           |      |             |                   | <i>Clinotanytus</i> sp.          | 3                   |                      |   |
|                           |      |             |                   | <i>Conchapelopia</i> sp.         | 13                  |                      |   |
|                           |      |             |                   | <i>Cryptochironomus</i> sp.      | 1                   |                      |   |
|                           |      |             |                   | <i>Hamischia</i> Complex D       | 4                   |                      |   |
|                           |      |             |                   | <i>Helopelopia</i> sp.           | 7                   |                      |   |
|                           |      |             |                   | <i>Larsia</i> sp.                | 1                   |                      |   |
|                           |      |             |                   | <i>Orthocladius luteipes</i>     | 1                   |                      |   |
|                           |      |             |                   | <i>Phaenopsectra</i> sp.         | 13                  |                      |   |
|                           |      |             |                   | <i>Polypedium aviceps</i>        | 4                   |                      |   |
|                           |      |             |                   | <i>Polypedium bergi</i>          | 1                   |                      |   |
|                           |      |             |                   | <i>Polypedium flavum</i>         | 1                   |                      |   |
|                           |      |             |                   | <i>Procladius</i> sp.            | 12                  |                      |   |
|                           |      |             |                   | <i>Stenochironomus</i> sp.       | 5                   |                      |   |
|                           |      |             |                   | Tanypodinae                      | 2                   |                      |   |
|                           |      |             |                   | <i>Telopelopia okoboji</i>       | 2                   |                      |   |
|                           |      |             |                   | <i>Thienemannimyia</i> group sp. | 11                  |                      |   |
|                           |      |             |                   | Simuliidae                       | <i>Simulium</i> sp. | 2                    |   |
|                           |      |             |                   | Ephemeroptera                    | Heptageniidae       | <i>Stenonema</i> sp. | 3 |
|                           |      |             |                   | Megaloptera                      | Sialidae            | <i>Sialis mohri</i>  | 4 |
|                           |      | Odonata     | Calopterygidae    | <i>Calopteryx angustipennis</i>  | 4                   |                      |   |
|                           |      |             | Coenagrionidae    | <i>Chromagrion</i> sp.           | 8                   |                      |   |
|                           |      |             | Corduliidae       | <i>Williamsonia</i> sp.          | 1                   |                      |   |
|                           |      |             | Gomphidae         | <i>Dromogomphus armatus</i>      | 1                   |                      |   |
|                           |      | Plecoptera  | Taeniopterygidae  | <i>Strophopteryx fasciata</i>    | 2                   |                      |   |
|                           |      | Trichoptera | Leptoceridae      | <i>Leptocerus americanus</i>     | 1                   |                      |   |
|                           |      |             |                   | <i>Oecetis</i> sp.               | 1                   |                      |   |
|                           |      |             | Limnephilidae     | Limnephilidae                    | 1                   |                      |   |
|                           |      |             | Polycentropodidae | <i>Nyctiophylax</i> sp.          | 4                   |                      |   |
|                           |      |             |                   | <i>Polycentropus</i> sp.         | 1                   |                      |   |
| Class: Clitellata         |      |             | Oligochaeta       | 5                                |                     |                      |   |



| Sub-ecoregion /Station ID | Ref. | Order           | Family            | Final Identification                | Individuals |
|---------------------------|------|-----------------|-------------------|-------------------------------------|-------------|
| <b>Jack's River</b>       |      |                 |                   |                                     |             |
| 66g-2                     | Yes  | Coleoptera      | Elmidae           | <i>Dubiraphia</i> sp.               | 14          |
|                           |      |                 |                   | Elmidae                             | 14          |
|                           |      |                 |                   | <i>Gonielmis dietrichi</i>          | 37          |
|                           |      |                 |                   | <i>Microcylloepus pusillus</i>      | 2           |
|                           |      |                 |                   | <i>Promoresia elegans</i>           | 6           |
|                           |      |                 |                   | <i>Stenelmis</i> sp.                | 22          |
|                           |      |                 | Psephenidae       | Psephenidae                         | 1           |
|                           |      |                 |                   | <i>Psephenus herricki</i>           | 2           |
|                           |      | Diptera         | Chironomidae      | Chironomidae                        | 1           |
|                           |      |                 |                   | <i>Rheotanytarsus exiguus</i> group | 2           |
|                           |      |                 |                   | <i>Tvetenia vitracies</i>           | 5           |
|                           |      |                 |                   | <i>Simulium</i> sp.                 | 9           |
|                           |      |                 | Tipulidae         | <i>Hexatoma</i> sp.                 | 4           |
|                           |      |                 |                   | <i>Tipula</i> sp.                   | 1           |
|                           |      | Ephemeroptera   | Baetidae          | <i>Pseudocloeon</i> sp.             | 12          |
|                           |      |                 | Heptageniidae     | <i>Stenonema</i> sp.                | 9           |
|                           |      | Hemiptera       | Veliidae          | <i>Rhagovelia obesa</i>             | 1           |
|                           |      | Heteroptera     |                   | <i>Paravelia</i> sp.                | 1           |
|                           |      | Megaloptera     | Corydalidae       | Corydalidae                         | 1           |
|                           |      |                 |                   | <i>Corydalus cornutus</i>           | 6           |
|                           |      | Neotaenioglossa | Pleuroceridae     | <i>Elimia</i> sp.                   | 1           |
|                           |      | Odonata         | Gomphidae         | Gomphidae                           | 1           |
|                           |      | Plecoptera      | Perlidae          | <i>Acroneuria abnormis</i>          | 10          |
|                           |      |                 |                   | <i>Paragnetina media</i>            | 1           |
|                           |      |                 |                   | <i>Perlesta</i> sp.                 | 2           |
|                           |      |                 |                   |                                     |             |
|                           |      | Trichoptera     | Brachycentridae   | Brachycentridae                     | 3           |
|                           |      |                 | Hydropsychidae    | <i>Cheumatopsyche</i> sp.           | 13          |
|                           |      |                 |                   | <i>Hydropsyche</i> sp.              | 29          |
|                           |      |                 |                   | Hydropsychidae                      | 8           |
|                           |      |                 | Philopotamidae    | <i>Chimarra</i> sp.                 | 1           |
|                           |      |                 | Polycentropodidae | <i>Polycentropus</i> sp.            | 5           |



| Sub-region / Station ID | Ref. | Order         | Family           | Final Identification              | Individuals |
|-------------------------|------|---------------|------------------|-----------------------------------|-------------|
| <b>Rough Creek</b>      |      |               |                  |                                   |             |
| 66g-2-2                 | Yes  | Coleoptera    | Elmidae          | Elmidae                           | 1           |
|                         |      |               |                  | <i>Optioservus</i> sp.            | 3           |
|                         |      | Diptera       | Ceratopogonidae  | <i>Bezzia</i> complex             | 4           |
|                         |      |               |                  | Chironomidae                      | 2           |
|                         |      |               | Chironomidae     | <i>Geothocladius</i> sp.          | 1           |
|                         |      |               |                  | <i>Hudsonimyia</i> sp.            | 1           |
|                         |      |               |                  | <i>Micropsectra</i> sp.           | 3           |
|                         |      |               |                  | <i>Microtendipes</i> sp.          | 1           |
|                         |      |               |                  | Orthocladinae                     | 6           |
|                         |      |               |                  | <i>Parametriochnemus</i> sp.      | 2           |
|                         |      |               |                  | <i>Polypedium</i> A               | 1           |
|                         |      |               |                  | <i>Pseudorthocladius</i> sp.      | 2           |
|                         |      |               |                  | <i>Stempellinella</i> sp.         | 6           |
|                         |      |               |                  | Tribe Tanytarsini                 | 1           |
|                         |      |               |                  | <i>Thienemanniella lobapodema</i> | 1           |
|                         |      |               |                  | <i>Thienemannimyia</i> group sp.  | 1           |
|                         |      |               | Tipulidae        | <i>Hexatoma</i> sp.               | 3           |
|                         |      |               |                  | <i>Pseudolimnophila</i> sp.       | 2           |
|                         |      |               |                  | Tipulidae                         | 3           |
|                         |      | Ephemeroptera | Ephemerellidae   | <i>Ephemerella</i> sp.            | 4           |
|                         |      |               |                  | <i>Ephemerella crenula</i>        | 2           |
|                         |      |               |                  | <i>Eurylophella doris</i> complex | 1           |
|                         |      |               |                  | <i>Epeorus</i> sp.                | 4           |
|                         |      |               | Heptageniidae    | <i>Epeorus dispar</i>             | 6           |
|                         |      |               |                  | <i>Epeorus pleuralis</i>          | 5           |
|                         |      |               |                  | <i>Stenonema</i> sp.              | 15          |
|                         |      |               |                  | Leptophlebiidae                   | 2           |
|                         |      |               | Siphonuridae     | Siphonuridae                      | 3           |
|                         |      | Isopoda       | Asellidae        | Asellidae                         | 5           |
|                         |      |               |                  | <i>Lirceus</i> sp.                | 14          |
|                         |      |               | Capniidae        | Capniidae                         | 11          |
|                         |      | Plecoptera    | Chloroperlidae   | Chloroperlidae                    | 4           |
|                         |      |               |                  | <i>Utaperla</i> sp.               | 18          |
|                         |      |               | Petloperlidae    | <i>Tallaperla</i> sp.             | 4           |
|                         |      |               | Perlidae         | <i>Acroneuria abnormis</i>        | 4           |
|                         |      |               | Perlidae         | <i>Diploperla duplicata</i>       | 1           |
|                         |      |               |                  | <i>Isoperla similis</i>           | 1           |
|                         |      |               | Pteronarcyidae   | <i>Pteronarcys dorsata</i>        | 1           |
|                         |      |               | Taeniopterygidae | <i>Oemopteryx</i> complex         | 3           |
|                         |      |               |                  | <i>Taeniopteryx</i> sp.           | 10          |
|                         |      | Trichoptera   | Brachycentridae  | <i>Micrasema</i> sp.              | 4           |
|                         |      |               | Hydropsychidae   | <i>Hydropsyche</i> sp.            | 2           |
|                         |      |               | Lepidostomatidae | <i>Lepidostoma</i> sp.            | 9           |
|                         |      |               | Limnephilidae    | <i>Hydatophylax argus</i>         | 21          |
|                         |      |               |                  | Limnephilidae                     | 5           |



|  |  |                   |                   |                         |   |
|--|--|-------------------|-------------------|-------------------------|---|
|  |  |                   | Odontoceridae     | <i>Marilia flexuosa</i> | 2 |
|  |  |                   | Polycentropodidae | <i>Nyctiophylax</i> sp. | 1 |
|  |  |                   |                   | Polycentropodidae       | 2 |
|  |  | Class: Clitellata |                   | Oligochaeta             | 4 |



| Sub-region / Station ID | Ref. | Order         | Family          | Final Identification                        | Individuals |
|-------------------------|------|---------------|-----------------|---------------------------------------------|-------------|
| <b>Mill Creek</b>       |      |               |                 |                                             |             |
| 66g-5                   | Yes  | Coleoptera    | Elmidae         | Elmidae                                     | 1           |
|                         |      |               |                 | <i>Microcylloepus pusillus</i>              | 1           |
|                         |      |               |                 | <i>Optioservus</i> sp.                      | 11          |
|                         |      |               | Psephenidae     | <i>Ectopria</i> sp.                         | 1           |
|                         |      |               |                 | <i>Psephenus hericki</i>                    | 7           |
|                         |      | Diptera       | Ceratopogonidae | <i>Bezzia</i> complex                       | 1           |
|                         |      |               | Chironomidae    | <i>Apedilum</i> sp.                         | 5           |
|                         |      |               |                 | Chironomidae                                | 2           |
|                         |      |               |                 | Chironominae                                | 3           |
|                         |      |               |                 | <i>Corynoneura</i> sp.                      | 2           |
|                         |      |               |                 | <i>Corynoneura</i> B                        | 1           |
|                         |      |               |                 | <i>Eukiefferiella</i> sp.                   | 1           |
|                         |      |               |                 | <i>Heterotrissocladius Cladwell/boltoni</i> | 1           |
|                         |      |               |                 | <i>Heterotrissocladius marcidus</i>         | 1           |
|                         |      |               |                 | <i>Hydrobaenus</i> sp.                      | 1           |
|                         |      |               |                 | <i>Microtendipes</i> sp.                    | 26          |
|                         |      |               |                 | <i>Nanocladius</i> sp.                      | 2           |
|                         |      |               |                 | Orthoclaudiinae                             | 3           |
|                         |      |               |                 | <i>Parakiefferiella coronata</i>            | 1           |
|                         |      |               |                 | <i>Polypedium aviceps</i>                   | 1           |
|                         |      |               |                 | <i>Polypedium flavum</i>                    | 2           |
|                         |      |               |                 | Tanypodinae                                 | 1           |
|                         |      |               |                 | <i>Thienemanniella lobapodema</i>           | 1           |
|                         |      |               | Dixidae         | <i>Dixa</i> sp.                             | 4           |
|                         |      |               | Simuliidae      | <i>Simulium</i> sp.                         | 1           |
|                         |      |               | Tipulidae       | <i>Dicranota</i> sp.                        | 2           |
|                         |      |               |                 | <i>Hexatoma</i> sp.                         | 3           |
|                         |      |               |                 | <i>Tipula</i> sp.                           | 2           |
|                         |      | Ephemeroptera | Baetidae        | <i>Pseudocloeon</i> sp.                     | 1           |
|                         |      |               | Baetiscidae     | Baetiscidae                                 | 1           |
|                         |      |               | Ephemerellidae  | <i>Attenella attenuata</i>                  | 13          |
|                         |      |               |                 | <i>Dannella</i> sp.                         | 2           |
|                         |      |               |                 | <i>Dannella lita</i>                        | 2           |
|                         |      |               |                 | Ephemerellidae                              | 2           |
|                         |      |               |                 | <i>Euryophella</i> sp.                      | 3           |
|                         |      |               | Heptageniidae   | <i>Epeorus</i> sp.                          | 9           |
|                         |      |               |                 | <i>Epeorus pleuralis</i>                    | 1           |
|                         |      |               |                 | Heptageniidae                               | 1           |
|                         |      |               |                 | <i>Stenonema</i> sp.                        | 8           |
|                         |      |               | Isonychiidae    | <i>Isonychia</i> sp.                        | 4           |
|                         |      |               | Leptophlebiidae | Leptophlebiidae                             | 2           |
|                         |      |               | Siphonuridae    | Siphonuridae                                | 2           |
|                         |      | Megaloptera   | Corydalidae     | Corydalidae                                 | 1           |
|                         |      |               |                 | <i>Corydalus cornutus</i>                   | 1           |



|  |  |             |                  |                              |                          |   |
|--|--|-------------|------------------|------------------------------|--------------------------|---|
|  |  |             |                  | <i>Nigronia serricornis</i>  | 1                        |   |
|  |  |             | Odonata          | Cordulegastridae             | <i>Cordulegaster</i> sp. | 1 |
|  |  |             |                  | Gomphidae                    | Gomphidae                | 5 |
|  |  | Plecoptera  | Capniidae        | <i>Allocapnia</i> sp.        | 2                        |   |
|  |  |             |                  | Capniidae                    | 13                       |   |
|  |  |             | Chloroperlidae   | <i>Alloperla</i> sp.         | 1                        |   |
|  |  |             |                  | Chloroperlidae               | 1                        |   |
|  |  |             |                  | <i>Haploperla brevis</i>     | 2                        |   |
|  |  |             |                  | <i>Utaperla</i>              | 9                        |   |
|  |  |             | Perlidae         | <i>Paragnetina kansensis</i> | 3                        |   |
|  |  |             |                  | <i>Paragnetina media</i>     | 5                        |   |
|  |  |             |                  | Perlidae                     | 2                        |   |
|  |  |             | Taeniopterygidae | <i>Oemopteryx</i> complex    | 1                        |   |
|  |  |             |                  | Taeniopterygidae             | 2                        |   |
|  |  |             |                  | Taeniopteryx                 | 2                        |   |
|  |  |             |                  | Glossosoma                   | 2                        |   |
|  |  | Trichoptera | Glossosomatidae  |                              |                          |   |
|  |  |             | Hydropsychidae   | <i>Cheumatopsyche</i>        | 19                       |   |
|  |  |             |                  | Hydropsyche                  | 9                        |   |
|  |  |             |                  | Hydropsychidae               | 2                        |   |
|  |  |             | Lepidostomatidae | <i>Lepidostoma</i>           | 10                       |   |
|  |  |             |                  | Lepidostomatidae             | 1                        |   |
|  |  |             |                  | <i>Thelopsyche</i>           | 1                        |   |
|  |  |             | Philopotamidae   | <i>Chimarra</i>              | 3                        |   |
|  |  |             |                  | <i>Dolophilodes</i>          | 2                        |   |



| Sub-ecoregion / Station ID | Ref. | Order      | Family          | Final Identification               | Individuals |
|----------------------------|------|------------|-----------------|------------------------------------|-------------|
| <b>Holly Creek</b>         |      |            |                 |                                    |             |
| 66g-6                      | Yes  | Coleoptera | Dryopidae       | <i>Helichus basalis</i>            | 1           |
|                            |      |            | Elmidae         | <i>Macronychus glabratus</i>       | 3           |
|                            |      |            |                 | <i>Optioservus</i> sp.             | 11          |
|                            |      |            |                 | <i>Promoresia elegans</i>          | 1           |
|                            |      |            |                 | <i>Stenelmis</i> sp.               | 7           |
|                            |      |            |                 | <i>Stenelmis bicarinata</i>        | 1           |
|                            |      |            | Psephenidae     | <i>Psephenus herricki</i>          | 14          |
|                            |      | Decapoda   | Cambaridae      | <i>Procambarus</i> sp.             | 4           |
|                            |      | Diptera    | Ceratopogonidae | <i>Bezzia</i> complex              | 1           |
|                            |      |            | Chironomidae    | <i>Apedilum</i> sp.                | 1           |
|                            |      |            |                 | Chironomidae                       | 3           |
|                            |      |            |                 | <i>Conchapelopia</i> sp.           | 3           |
|                            |      |            |                 | <i>Cricotopus</i> sp.              | 1           |
|                            |      |            |                 | <i>Helopelopia</i> sp.             | 1           |
|                            |      |            |                 | <i>Limnophyes</i> sp.              | 1           |
|                            |      |            |                 | <i>Micropectra</i> sp.             | 1           |
|                            |      |            |                 | <i>Microtendipes pedellus</i> grp. | 1           |
|                            |      |            |                 | Orthocladinae                      | 2           |
|                            |      |            |                 | <i>Paracricotopus</i> sp.          | 3           |
|                            |      |            |                 | <i>Parakiefferiella</i> B          | 1           |
|                            |      |            |                 | <i>Paratanytarsus</i> sp.          | 1           |
|                            |      |            |                 | <i>Platysmittia</i> sp.            | 1           |
|                            |      |            |                 | <i>Polypedilum aviceps</i>         | 11          |
|                            |      |            |                 | <i>Polypedilum flavum</i>          | 4           |
|                            |      |            |                 | <i>Polypedilum scalaenum</i>       | 6           |
|                            |      |            |                 | <i>Pseudochironomus</i> sp.        | 1           |
|                            |      |            |                 | <i>Rheotanytarsus</i> sp.          | 5           |
|                            |      |            |                 | <i>Rheotanytarsus</i> A            | 1           |
|                            |      |            |                 | <i>Rheotanytarsus pellucidus</i>   | 1           |
|                            |      |            |                 | <i>Stempellinella</i> sp.          | 1           |
|                            |      |            |                 | <i>Tanytarsus</i> sp.              | 1           |
|                            |      |            |                 | <i>Thienemanniella</i> sp.         | 3           |
|                            |      |            |                 | <i>Thienemanniella xena</i>        | 1           |
|                            |      |            |                 | <i>Tvetenia</i> sp.                | 1           |
|                            |      |            | Empididae       | <i>Hemerodromia</i> sp.            | 4           |
|                            |      |            | Simuliidae      | <i>Simulium</i> sp.                | 4           |
|                            |      |            | Tabanidae       | <i>Tabanus</i> sp.                 | 1           |
|                            |      |            | Tipulidae       | <i>Antocha</i> sp.                 | 3           |
|                            |      |            |                 | <i>Erioptera</i> sp.               | 1           |
|                            |      |            |                 | <i>Hexatoma</i> sp.                | 2           |
|                            |      |            |                 | Tipulidae                          | 1           |



|  |  |                   |                   |                                |    |
|--|--|-------------------|-------------------|--------------------------------|----|
|  |  | Ephemeroptera     | Ameletidae        | <i>Ameletus</i> sp.            | 6  |
|  |  |                   | Baetidae          | Baetidae                       | 8  |
|  |  |                   |                   | <i>Baetis</i> sp.              | 2  |
|  |  |                   |                   | <i>Baetis brunneicolor</i>     | 1  |
|  |  |                   |                   | <i>Baetis intercalaris</i>     | 1  |
|  |  |                   |                   | <i>Fallceon</i> sp.            | 5  |
|  |  |                   |                   | <i>Pseudocloeon</i> sp.        | 1  |
|  |  |                   | Baetiscidae       | <i>Baetisca carolina</i>       | 2  |
|  |  |                   | Caenidae          | <i>Caenis</i> sp.              | 3  |
|  |  |                   | Ephemerellidae    | <i>Attenella attenuata</i>     | 1  |
|  |  |                   | Ephemeridae       | <i>Ephemera simulans</i>       | 1  |
|  |  |                   |                   | <i>Epeorus</i> sp.             | 1  |
|  |  | Heptageniidae     |                   | <i>Stenonema</i> sp.           | 8  |
|  |  |                   |                   | <i>Stenonema femoratum</i>     | 3  |
|  |  |                   |                   | <i>Stenonema sinclairi</i>     | 3  |
|  |  |                   |                   | <i>Isonychia</i> sp.           | 3  |
|  |  | Hemiptera         | Veliidae          | <i>Rhagovelia obesa</i>        | 1  |
|  |  |                   |                   | <i>Corydalus cornutus</i>      | 5  |
|  |  | Megaloptera       | Corydalidae       | <i>Nigronia serricornis</i>    | 3  |
|  |  |                   |                   | <i>Argia</i> sp.               | 5  |
|  |  | Odonata           | Coenagrionidae    | <i>Chromagrion conditum</i>    | 1  |
|  |  |                   |                   | <i>Argomphus villosipes</i>    | 5  |
|  |  | Plecoptera        | Chloroperiidae    | <i>Haploperla brevis</i>       | 3  |
|  |  |                   | Perlidae          | <i>Acroeuria abnormis</i>      | 4  |
|  |  |                   |                   | <i>Paragnetina immarginata</i> | 3  |
|  |  | Trichoptera       | Hydropsychidae    | <i>Ceratopsyche sparna</i>     | 7  |
|  |  |                   |                   | <i>Cheumatopsyche</i> sp.      | 15 |
|  |  |                   |                   | <i>Hydropsyche decalda</i>     | 8  |
|  |  |                   | Philopotamidae    | <i>Dolophilodes</i> sp.        | 1  |
|  |  |                   | Polycentropodidae | <i>Neureclipsis</i> sp.        | 1  |
|  |  |                   |                   | <i>Polycentropus</i> sp.       | 1  |
|  |  |                   | Psychomyiidae     | <i>Psychomyia flava</i>        | 1  |
|  |  |                   | Rhyacophilidae    | <i>Rhyacophila fuscata</i>     | 1  |
|  |  | Class: Clitellata |                   | Oligochaeta                    | 4  |



| Sub-ecoregion /Station ID | Ref. | Order         | Family          | Final Identification                             | Individuals |
|---------------------------|------|---------------|-----------------|--------------------------------------------------|-------------|
| <b>Nimblewill Creek</b>   |      |               |                 |                                                  |             |
| 66g-23                    | Yes  | Coleoptera    | Elmidae         | <i>Macronychus glabratus</i>                     | 2           |
|                           |      |               |                 | <i>Optioservus</i> sp.                           | 9           |
|                           |      |               |                 | <i>Optioservus ovalis</i>                        | 2           |
|                           |      |               | Psephenidae     | <i>Ectopria</i> sp.                              | 2           |
|                           |      |               |                 | <i>Psephenus hericki</i>                         | 5           |
|                           |      | Diptera       | Ceratopogonidae | <i>Bezzia</i> complex                            | 4           |
|                           |      |               |                 | <i>Apedilum</i> sp.                              | 12          |
|                           |      |               | Chironomidae    | <i>Chironomidae</i>                              | 1           |
|                           |      |               |                 | <i>Corynoneura</i> sp.                           | 2           |
|                           |      |               |                 | <i>Cryptochironomus</i> sp.                      | 1           |
|                           |      |               |                 | <i>Djalmabatista pulcher</i> variant (5 toothed) | 1           |
|                           |      |               |                 | <i>Heterotrissocladius marcidus</i>              | 1           |
|                           |      |               |                 | <i>Micropsectra</i> A                            | 4           |
|                           |      |               |                 | <i>Micropsectra</i> E                            | 1           |
|                           |      |               |                 | <i>Microtendipes</i> sp.                         | 3           |
|                           |      |               |                 | <i>Orthoclaadiinae</i>                           | 2           |
|                           |      |               |                 | <i>Paracladopelma dons</i>                       | 1           |
|                           |      |               |                 | <i>Paralauterborniella nigrohalterale</i>        | 2           |
|                           |      |               |                 | <i>Paraphaenocladus</i> sp.                      | 1           |
|                           |      |               |                 | <i>Phaenopsectra</i> sp.                         | 1           |
|                           |      |               |                 | <i>Polypedilum</i> sp.                           | 1           |
|                           |      |               |                 | <i>Polypedilum aviceps</i>                       | 4           |
|                           |      |               |                 | <i>Pseudorthocladus</i> sp.                      | 2           |
|                           |      |               |                 | <i>Reomyia</i> sp.                               | 1           |
|                           |      |               |                 | <i>Stempellinella</i> sp.                        | 11          |
|                           |      |               |                 | <i>Tanypodinae</i>                               | 1           |
|                           |      |               |                 | <i>Thienemanniella lobapodema</i>                | 1           |
|                           |      |               |                 | <i>Thienemannimyia</i> group sp.                 | 2           |
|                           |      |               |                 | <i>Xylotopus par</i>                             | 1           |
|                           |      |               | Dixidae         | <i>Dixa</i> sp.                                  | 2           |
|                           |      |               | Simuliidae      | <i>Simulium</i> sp.                              | 1           |
|                           |      |               | Tabanidae       | Tabanidae                                        | 1           |
|                           |      |               | Tipulidae       | <i>Limnophila</i> sp.                            | 1           |
|                           |      |               |                 | Tipulidae                                        | 2           |
|                           |      | Ephemeroptera | Baetiscidae     | <i>Baetisca carolina</i>                         | 1           |
|                           |      |               | Ephemerellidae  | <i>Attenella attenuata</i>                       | 1           |
|                           |      |               |                 | <i>Dannella</i> sp.                              | 6           |
|                           |      |               |                 | <i>Dannella lita</i>                             | 1           |
|                           |      |               |                 | <i>Ephemerella</i> sp.                           | 2           |



|  |  |                   |                              |                                          |    |
|--|--|-------------------|------------------------------|------------------------------------------|----|
|  |  |                   |                              | <i>Ephemerella argo</i>                  | 4  |
|  |  |                   |                              | Ephemerellidae                           | 3  |
|  |  |                   |                              | <i>Eurylophella donis</i><br>complex     | 2  |
|  |  |                   | Ephemeridae<br>Heptageniidae | <i>Ephemerella</i> sp.                   | 2  |
|  |  |                   |                              | <i>Epeorus</i> sp.                       | 2  |
|  |  |                   |                              | <i>Epeorus dispar</i>                    | 7  |
|  |  |                   |                              | <i>Epeorus pleuralis</i>                 | 4  |
|  |  |                   |                              | Heptageniidae                            | 1  |
|  |  |                   |                              | <i>Stenonema</i> sp.                     | 21 |
|  |  |                   | Leptophlebiidae              | <i>Habrophlebiodes</i><br>sp.            | 1  |
|  |  |                   |                              | Leptophlebiidae                          | 7  |
|  |  | Hemiptera         | Veliidae                     | <i>Rhagovelia obesa</i>                  | 1  |
|  |  | Odonata           | Calopterygidae               | <i>Hetaerina</i> sp.                     | 2  |
|  |  |                   | Cordulegastridae             | <i>Cordulegaster</i> sp.                 | 2  |
|  |  |                   | Gomphidae                    | <i>Dromogomphus</i><br><i>spinosus</i>   | 2  |
|  |  |                   |                              | Gomphidae                                | 4  |
|  |  | Plecoptera        | Capniidae                    | <i>Allocaenia</i> sp.                    | 7  |
|  |  |                   |                              | Capniidae                                | 3  |
|  |  |                   | Peltoperlidae                | <i>Tallaperla</i> sp.                    | 1  |
|  |  |                   | Perlidae                     | <i>Acrotrichia</i><br><i>abnormis</i>    | 4  |
|  |  |                   |                              | <i>Attaneuria ruralis</i>                | 1  |
|  |  |                   |                              | <i>Paragnetina</i><br><i>immarginata</i> | 1  |
|  |  |                   | Perlodidae                   | <i>Isoperla similis</i>                  | 1  |
|  |  |                   |                              | Perlodidae                               | 1  |
|  |  |                   |                              | <i>Yugus arinus</i>                      | 1  |
|  |  |                   | Taeniopterygidae             | <i>Oemopteryx</i><br>complex             | 1  |
|  |  |                   |                              | <i>Taeniopteryx</i> sp.                  | 4  |
|  |  | Trichoptera       | Hydropsychidae               | <i>Cheumatopsyche</i><br>sp.             | 7  |
|  |  |                   |                              | <i>Hydropsyche</i> sp.                   | 5  |
|  |  |                   |                              | Hydropsychidae                           | 1  |
|  |  |                   | Hydroptilidae                | Hydroptilidae                            | 1  |
|  |  |                   | Limnephilidae                | <i>Hydatophylax</i><br><i>argus</i>      | 4  |
|  |  |                   |                              | Limnephilidae                            | 2  |
|  |  |                   |                              | <i>Pycnopsyche</i> sp.                   | 5  |
|  |  |                   | Philopotamidae               | <i>Dolophilodes</i> sp.                  | 4  |
|  |  |                   | Polycentropodidae            | <i>Neureclipsis</i> sp.                  | 18 |
|  |  |                   | Psychomyiidae                | <i>Lype diversa</i>                      | 1  |
|  |  | Class: Clitellata |                              | Oligochaeta                              | 3  |



| Sub-ecoregion /Station ID | Ref. | Order          | Family          | Final Identification                  | Individuals |
|---------------------------|------|----------------|-----------------|---------------------------------------|-------------|
| <b>Polecat Branch</b>     |      |                |                 |                                       |             |
| 66g-30                    | No   | Basommatophora | Physidae        | Physidae                              | 1           |
|                           |      | Coleoptera     | Elmidae         | <i>Dubiraphia</i> sp.                 | 1           |
|                           |      |                |                 | <i>Optioservus</i> sp.                | 3           |
|                           |      |                |                 |                                       |             |
|                           |      | Decapoda       | Cambaridae      | Cambarinae                            | 1           |
|                           |      | Diptera        | Ceratopogonidae | Ceratopogonidae                       | 2           |
|                           |      |                | Chironomidae    | <i>Ablabesmyia mallochi</i>           | 1           |
|                           |      |                |                 | <i>Brillia</i> sp.                    | 1           |
|                           |      |                |                 | <i>Brillia flavifrons</i>             | 1           |
|                           |      |                |                 | <i>Chironomus</i> sp.                 | 10          |
|                           |      |                |                 | <i>Corynoneura</i> sp.                | 5           |
|                           |      |                |                 | <i>Cryptochironomus</i> sp.           | 2           |
|                           |      |                |                 | <i>Diamesa</i> sp.                    | 4           |
|                           |      |                |                 | <i>Eukiefferiella</i> sp.             | 5           |
|                           |      |                |                 | <i>Eukiefferiella brehmi</i> group    | 8           |
|                           |      |                |                 | <i>Microtendipes pedellus</i> grp.    | 1           |
|                           |      |                |                 | <i>Microtendipes rydalensis</i>       | 1           |
|                           |      |                |                 | <i>Nanocladius</i> sp.                | 1           |
|                           |      |                |                 | <i>Odontomesa fulva</i>               | 3           |
|                           |      |                |                 | <i>Orthocladius obumbratus</i>        | 5           |
|                           |      |                |                 | <i>Parametriochnemus</i> sp.          | 12          |
|                           |      |                |                 | <i>Phaenopsectra obediens</i> grp.    | 7           |
|                           |      |                |                 | <i>Phaenopsectra/Tribelos</i> complex | 1           |
|                           |      |                |                 | <i>Polypedium flavum</i>              | 1           |
|                           |      |                |                 | <i>Polypedium laetum</i>              | 1           |
|                           |      |                |                 | <i>Polypedium scalaenum</i>           | 4           |
|                           |      |                |                 | <i>Pothastia longimana</i>            | 2           |
|                           |      |                |                 | <i>Rheotanytarsus exiguus</i> group   | 3           |
|                           |      |                |                 | <i>Thienemanniella</i> sp.            | 1           |
|                           |      |                |                 | <i>Thienemannimyia</i> group sp.      | 13          |
|                           |      |                |                 | <i>Tribelos jucundus</i>              | 1           |
|                           |      |                | Dixidae         | <i>Dixa</i> sp.                       | 1           |
|                           |      |                | Simuliidae      | <i>Prosimulium</i> sp.                | 2           |
|                           |      |                |                 | <i>Simulium</i> sp.                   | 1           |
|                           |      |                | Tipulidae       | <i>Antocha</i> sp.                    | 2           |
|                           |      |                |                 | <i>Leptotarsus</i> sp.                | 1           |
|                           |      | Ephemeroptera  | Baetidae        | <i>Centropilum</i> sp.                | 4           |
|                           |      |                | Heptageniidae   | Heptageniidae                         | 3           |



|  |                   |                |                                              |    |
|--|-------------------|----------------|----------------------------------------------|----|
|  |                   |                | <i>Stenonema modestum</i>                    | 32 |
|  | Megaloptera       | Corydalidae    | <i>Corydalis comutus</i>                     | 1  |
|  | Odonata           | Gomphidae      | Gomphidae                                    | 1  |
|  | Plecoptera        | Nemouridae     | <i>Shipsa rotunda</i>                        | 1  |
|  | Trichoptera       | Hydropsychidae | <i>Cheumatopsyche</i> sp.                    | 55 |
|  |                   |                | <i>Hydropsyche betteri/depravata</i> complex | 4  |
|  |                   |                | Limnephilidae                                | 1  |
|  | Veneroida         | Pisidiidae     | <i>Pisidium compressum</i>                   | 1  |
|  | Class: Clitellata |                | Oligochaeta                                  | 15 |



| Sub-ecoregion /Station ID   | Ref. | Order           | Family           | Final Identification                | Individuals |
|-----------------------------|------|-----------------|------------------|-------------------------------------|-------------|
| <b>Sharp Mountain Creek</b> |      |                 |                  |                                     |             |
| 66g-31                      | No   | Coleoptera      | Elmidae          | <i>Dubiraphia</i> sp.               | 1           |
|                             |      |                 |                  | Elmidae                             | 1           |
|                             |      |                 |                  | <i>Gonielmis dietrichi</i>          | 1           |
|                             |      |                 |                  | <i>Macronychus glabratus</i>        | 6           |
|                             |      |                 |                  | <i>Optioservus</i> sp.              | 15          |
|                             |      | Diptera         | Chironomidae     | <i>Ablabesmyia</i> sp.              | 1           |
|                             |      |                 |                  | <i>Ablabesmyia mallochi</i>         | 3           |
|                             |      |                 |                  | <i>Brillia</i> sp.                  | 2           |
|                             |      |                 |                  | <i>Eukiefferiella brehmi</i> group  | 8           |
|                             |      |                 |                  | <i>Orthocladus obumbratus</i>       | 1           |
|                             |      |                 |                  | <i>Paracladopelma undine</i>        | 1           |
|                             |      |                 |                  | <i>Parakiefferiella</i> sp.         | 1           |
|                             |      |                 |                  | <i>Parakiefferiella B</i>           | 1           |
|                             |      |                 |                  | <i>Phaenopsectra punctipes</i> grp. | 1           |
|                             |      |                 |                  | <i>Polypedilum A</i>                | 1           |
|                             |      |                 |                  | <i>Polypedilum flavum</i>           | 2           |
|                             |      |                 |                  | <i>Potthastia</i> sp.               | 1           |
|                             |      |                 |                  | <i>Potthastia longimana</i>         | 3           |
|                             |      |                 |                  | <i>Rheotanytarsus</i> sp.           | 1           |
|                             |      |                 |                  | <i>Rheotanytarsus exiguus</i> group | 5           |
|                             |      |                 |                  | <i>Rheotanytarsus pellucidus</i>    | 1           |
|                             |      |                 |                  | <i>Tanytarsus M</i>                 | 1           |
|                             |      |                 |                  | <i>Thienemannimyia</i> group sp.    | 2           |
|                             |      |                 |                  | <i>Tribelos jucundus</i>            | 1           |
|                             |      |                 | Empididae        | <i>Hemerodromia</i> sp.             | 2           |
|                             |      |                 | Simuliidae       | <i>Prosimulium</i> sp.              | 1           |
|                             |      |                 |                  | <i>Simulium</i> sp.                 | 3           |
|                             |      |                 | Tipulidae        | <i>Leptotarsus</i> sp.              | 1           |
|                             |      | Ephemeroptera   | Ephemerellidae   | <i>Ephemerella argo</i>             | 57          |
|                             |      |                 | Heptageniidae    | <i>Stenonema modestum</i>           | 11          |
|                             |      |                 | Isonychiidae     | <i>Isonychia</i> sp.                | 9           |
|                             |      | Neotaenioglossa | Pleuroceridae    | <i>Elimia</i> sp.                   | 1           |
|                             |      | Plecoptera      | Perlodidae       | <i>Isoperla clio</i>                | 1           |
|                             |      |                 |                  | <i>Isoperla lata</i>                | 17          |
|                             |      |                 |                  | Perlodidae                          | 1           |
|                             |      |                 | Taeniopterygidae | <i>Oemopteryx</i> complex           | 26          |
|                             |      | Trichoptera     | Brachycentridae  | <i>Brachycentrus</i> sp.            | 1           |
|                             |      |                 | Hydropsychidae   | <i>Ceratopsyche sparna</i>          | 2           |
|                             |      |                 |                  | <i>Cheumatopsyche</i> sp.           | 1           |
|                             |      |                 |                  | Hydropsychidae                      | 1           |
|                             |      |                 |                  | <i>Potamyia flava</i>               | 5           |
|                             |      |                 | Limnephilidae    | <i>Pycnopsyche divergens</i>        | 1           |



|  |  |                          |                         |   |
|--|--|--------------------------|-------------------------|---|
|  |  | Philopotamidae           | <i>Dolophilodes</i> sp. | 1 |
|  |  | <b>Class: Clitellata</b> | Oligochaeta             | 2 |



| Sub-ecoregion /Station ID        | Ref. | Order         | Family          | Final Identification                | Individuals |
|----------------------------------|------|---------------|-----------------|-------------------------------------|-------------|
| <b>Tributary To Talking Rock</b> |      |               |                 |                                     |             |
| 66g-42                           | No   | Coleoptera    | Elmidae         | <i>Microcylloepus pusillus</i>      | 7           |
|                                  |      |               |                 | <i>Optioservus</i> sp.              | 1           |
|                                  |      |               |                 | <i>Oulimnius latusculus</i>         | 4           |
|                                  |      | Diptera       | Ceratopogonidae | <i>Bezzia</i> complex               | 1           |
|                                  |      |               |                 | Ceratopogonidae                     | 3           |
|                                  |      |               | Chironomidae    | <i>Ablabesmyia mallochi</i>         | 2           |
|                                  |      |               |                 | <i>Brillia</i> sp.                  | 1           |
|                                  |      |               |                 | <i>Corynoneura</i> sp.              | 1           |
|                                  |      |               |                 | <i>Diamesa</i> sp.                  | 1           |
|                                  |      |               |                 | <i>Eukiefferiella brehmi</i> group  | 4           |
|                                  |      |               |                 | <i>Microtendipes</i> sp.            | 1           |
|                                  |      |               |                 | <i>Microtendipes pedellus</i> grp.  | 19          |
|                                  |      |               |                 | <i>Parachaetocladius abnobaeus</i>  | 3           |
|                                  |      |               |                 | <i>Parametriocnemus</i> sp.         | 22          |
|                                  |      |               |                 | <i>Polypedilum</i> sp.              | 1           |
|                                  |      |               |                 | <i>Polypedilum aviceps</i>          | 2           |
|                                  |      |               |                 | <i>Rheocricotopus robacki</i>       | 2           |
|                                  |      |               |                 | <i>Rheotanytarsus exiguus</i> group | 4           |
|                                  |      |               |                 | <i>Stempellinella</i> B             | 1           |
|                                  |      |               |                 | Tribe Tanytarsini                   | 1           |
|                                  |      |               |                 | <i>Tanytarsus M</i>                 | 2           |
|                                  |      |               |                 | <i>Tanytarsus W</i>                 | 2           |
|                                  |      |               |                 | <i>Thienemanniella xena</i>         | 4           |
|                                  |      |               |                 | <i>Thienemannimyia</i> group sp.    | 4           |
|                                  |      |               |                 | <i>Trissopelopia ogemawi</i>        | 1           |
|                                  |      |               |                 | <i>Tvetenia</i> sp.                 | 1           |
|                                  |      |               |                 | <i>Zavrelimyia</i> sp.              | 1           |
|                                  |      |               | Empididae       | <i>Hemerodromia</i> sp.             | 2           |
|                                  |      |               | Simuliidae      | <i>Prosimulium</i> sp.              | 5           |
|                                  |      | Ephemeroptera | Ephemerellidae  | <i>Attenella attenuata</i>          | 2           |
|                                  |      |               |                 | <i>Ephemerella</i> sp.              | 17          |
|                                  |      |               |                 | Ephemerellidae                      | 10          |
|                                  |      |               |                 | <i>Eurylophella doris</i> complex   | 2           |
|                                  |      |               |                 | <i>Serratella</i> sp.               | 2           |
|                                  |      |               |                 | <i>Epeorus</i> sp.                  | 2           |
|                                  |      |               | Heptageniidae   | <i>Epeorus dispar</i>               | 1           |
|                                  |      |               |                 | <i>Epeorus pleuralis</i>            | 1           |



|  |  |                           |                            |                                 |                            |   |
|--|--|---------------------------|----------------------------|---------------------------------|----------------------------|---|
|  |  |                           | Heptageniidae              | 4                               |                            |   |
|  |  |                           | <i>Stenonema</i> sp.       | 5                               |                            |   |
|  |  |                           | <i>Stenonema femoratum</i> | 1                               |                            |   |
|  |  |                           | <i>Stenonema modestum</i>  | 2                               |                            |   |
|  |  | Haplotaxida               | Lumbricidae                | Lumbricidae                     | 1                          |   |
|  |  | Megaloptera               | Corydalidae                | <i>Corydalus cornutus</i>       | 4                          |   |
|  |  | Odonata                   | Calopterygidae             | <i>Calopteryx angustipennis</i> | 1                          |   |
|  |  | Plecoptera                | Chloroperlidae             | Chloroperlidae                  | 6                          |   |
|  |  |                           |                            | <i>Haploperla brevis</i>        | 1                          |   |
|  |  |                           | Nemouridae                 | Nemouridae                      | 1                          |   |
|  |  |                           | Perlidae                   | <i>Acroneuria abnormis</i>      | 1                          |   |
|  |  |                           |                            | Perlidae                        | 1                          |   |
|  |  |                           |                            | Perlodidae                      | <i>Isoperla</i> sp.        | 6 |
|  |  |                           | <i>Isoperla clio</i>       |                                 | 2                          |   |
|  |  |                           | <i>Isoperla holochlora</i> |                                 | 2                          |   |
|  |  |                           | <i>Isoperla marlynia</i>   |                                 | 4                          |   |
|  |  |                           | Taeniopterygidae           | <i>Oemopteryx complex</i>       | 1                          |   |
|  |  |                           | Trichoptera                | Hydropsychidae                  | <i>Ceratopsyche</i> sp.    | 1 |
|  |  |                           |                            |                                 | <i>Ceratopsyche morosa</i> | 1 |
|  |  | <i>Cheumatopsyche</i> sp. |                            |                                 | 3                          |   |
|  |  | Hydropsychidae            |                            |                                 | 1                          |   |
|  |  | Limnephilidae             |                            | Limnephilidae                   | 2                          |   |
|  |  | Philopotamidae            |                            | <i>Chimarra</i> sp.             | 5                          |   |
|  |  |                           |                            | <i>Dolophiodes</i> sp.          | 2                          |   |
|  |  | Polycentropodidae         |                            | Polycentropodidae               | 1                          |   |
|  |  | Rhyacophilidae            |                            | <i>Rhyacophila</i> sp.          | 5                          |   |
|  |  |                           |                            | <i>Rhyacophila fuscula</i>      | 1                          |   |
|  |  | Class: Clitellata         |                            |                                 | 2                          |   |
|  |  |                           |                            | Oligochaeta                     | 2                          |   |



| Sub-ecoregion /Station ID | Ref. | Order         | Family         | Final Identification                | Individuals |
|---------------------------|------|---------------|----------------|-------------------------------------|-------------|
| Little Scarecorn Creek    |      |               |                |                                     |             |
| 66g-44                    | No   | Coleoptera    | Elmidae        | <i>Macronychus glabratus</i>        | 3           |
|                           |      |               |                | <i>Microcylloepus pusillus</i>      | 1           |
|                           |      |               |                | <i>Optioservus</i> sp.              | 1           |
|                           |      |               | Psephenidae    | <i>Psephenus hericki</i>            | 3           |
|                           |      | Diptera       | Chironomidae   | <i>Ablabesmyia mallochi</i>         | 1           |
|                           |      |               |                | <i>Chaetocladius</i> sp.            | 1           |
|                           |      |               |                | <i>Eukiefferiella brehmi</i> group  | 12          |
|                           |      |               |                | <i>Labrundinia pilosella</i>        | 1           |
|                           |      |               |                | <i>Micropsectra</i> D               | 1           |
|                           |      |               |                | Orthoclaadiinae                     | 1           |
|                           |      |               |                | <i>Orthoclaadius obumbratus</i>     | 3           |
|                           |      |               |                | <i>Parakiefferiella</i> B           | 2           |
|                           |      |               |                | <i>Parakiefferiella</i> F           | 2           |
|                           |      |               |                | <i>Parametrioctenemus</i> sp.       | 9           |
|                           |      |               |                | <i>Polypedilum flavum</i>           | 3           |
|                           |      |               |                | <i>Pothastia longimana</i>          | 3           |
|                           |      |               |                | <i>Rheocricotopus</i> sp.           | 1           |
|                           |      |               |                | <i>Rheocricotopus robacki</i>       | 32          |
|                           |      |               |                | <i>Rheocricotopus unidentatus</i>   | 1           |
|                           |      |               |                | <i>Rheotanytarsus exiguus</i> group | 34          |
|                           |      |               |                | <i>Rheotanytarsus pellucidus</i>    | 12          |
|                           |      |               |                | <i>Stenochironomus</i> sp.          | 1           |
|                           |      |               |                | Tribe Tanytarsini                   | 1           |
|                           |      |               |                | <i>Tanytarsus</i> P                 | 3           |
|                           |      |               |                | <i>Thienemannimyia</i> group sp.    | 2           |
|                           |      |               |                | <i>Tribelos jucundus</i>            | 1           |
|                           |      |               |                | <i>Tvetenia bravarica</i> grp.      | 3           |
|                           |      |               |                | <i>Tvetenia vitracies</i>           | 2           |
|                           |      |               | Dixidae        | <i>Dixa</i> sp.                     | 1           |
|                           |      |               | Empididae      | <i>Dolichocephala</i> sp.           | 1           |
|                           |      |               |                | <i>Hemerodromia</i> sp.             | 2           |
|                           |      |               | Tipulidae      | <i>Leptotarsus</i> sp.              | 1           |
|                           |      | Ephemeroptera | Heptageniidae  | <i>Stenonema</i> sp.                | 15          |
|                           |      |               |                | <i>Stenonema modestum</i>           | 21          |
|                           |      |               | Isonychiidae   | <i>Isonychia</i> sp.                | 6           |
|                           |      | Odonata       | Calopterygidae | <i>Calopteryx</i> sp.               | 2           |
|                           |      | Plecoptera    | Capniidae      | Capniidae                           | 2           |
|                           |      |               | Nemouridae     | Nemouridae                          | 1           |
|                           |      |               | Perlodidae     | <i>Isoperla</i> sp.                 | 1           |
|                           |      |               |                | <i>Isoperla</i> lata                | 1           |
|                           |      | Trichoptera   | Hydropsychidae | <i>Ceratopsyche spama</i>           | 1           |
|                           |      |               |                | <i>Cheumatopsyche</i> sp.           | 15          |
|                           |      |               |                | Hydropsychidae                      | 1           |
|                           |      |               |                | <i>Potamyia flava</i>               | 7           |



|  |  |                          |                        |   |
|--|--|--------------------------|------------------------|---|
|  |  | Limnephilidae            | <i>Pycnopsyche</i> sp. | 2 |
|  |  | <b>Class: Clitellata</b> | Oligochaeta            | 2 |



| Sub-ecoregion /Station ID | Ref. | Order         | Family              | Final Identification               | Individuals |
|---------------------------|------|---------------|---------------------|------------------------------------|-------------|
| Yellow Creek              |      |               |                     |                                    |             |
| 66g-71                    | No   | Coleoptera    | Dytiscidae          | <i>Hygrotus farctus</i>            | 1           |
|                           |      |               | Elmidae             | <i>Microcylloepus pusillus</i>     | 2           |
|                           |      |               |                     | <i>Optioservus</i> sp.             | 2           |
|                           |      |               |                     | <i>Oulimnius latiusculus</i>       | 1           |
|                           |      | Diptera       | Ceratopogonidae     | <i>Bezzia</i> complex              | 1           |
|                           |      |               |                     | <i>Dasyhelea</i> sp.               | 1           |
|                           |      |               | Chironomidae        | <i>Brillia</i> sp.                 | 2           |
|                           |      |               |                     | <i>Brillia flavifrons</i>          | 1           |
|                           |      |               |                     | Chironominae                       | 1           |
|                           |      |               |                     | <i>Corynoneura</i> sp.             | 1           |
|                           |      |               |                     | <i>Eukiefferiella brehmi</i> grp.  | 2           |
|                           |      |               |                     | <i>Microtendipes rydalsensis</i>   | 1           |
|                           |      |               |                     | <i>Nanocladius alternantherae</i>  | 1           |
|                           |      |               |                     | <i>Parakiefferiella</i> F          | 1           |
|                           |      |               |                     | <i>Parametriochnemus</i> sp.       | 3           |
|                           |      |               |                     | <i>Paratanytarsus</i> sp.          | 2           |
|                           |      |               |                     | <i>Paratanytarsus dissimilis</i>   | 1           |
|                           |      |               |                     | <i>Polypedilum aviceps</i>         | 1           |
|                           |      |               |                     | <i>Polypedilum flavum</i>          | 2           |
|                           |      |               |                     | <i>Rheotanytarsus</i> sp.          | 2           |
|                           |      |               |                     | <i>Rheotanytarsus A</i>            | 4           |
|                           |      |               |                     | <i>Rheotanytarsus exiguus</i> grp. | 13          |
|                           |      |               |                     | <i>Stempellinella A</i>            | 1           |
|                           |      |               |                     | <i>Stenochironomus</i> sp.         | 2           |
|                           |      |               |                     | Tribe Tanytarsini                  | 1           |
|                           |      |               |                     | <i>Tanytarsus</i> sp.              | 2           |
|                           |      |               |                     | <i>Tanytarsus M</i>                | 7           |
|                           |      |               |                     | <i>Tanytarsus W</i>                | 5           |
|                           |      |               |                     | <i>Thienemanniella</i> sp.         | 1           |
|                           |      |               |                     | <i>Thienemanniella xena</i>        | 1           |
|                           |      |               |                     | <i>Thienemannimyia</i> group sp.   | 9           |
|                           |      |               |                     | <i>Trissopelopia ogemawi</i>       | 1           |
|                           |      |               |                     | <i>Zavrelimyia thryptica</i>       | 1           |
|                           |      |               | Empididae           | Empididae                          | 1           |
|                           |      |               |                     | <i>Hemerodromia</i> sp.            | 3           |
|                           |      | Simuliidae    | Simuliidae          | 1                                  |             |
|                           |      |               | <i>Simulium</i> sp. | 4                                  |             |
|                           |      | Syrphidae     | <i>Neoscia</i> sp.  | 1                                  |             |
|                           |      | Tipulidae     | <i>Antocha</i> sp.  | 1                                  |             |
|                           |      |               | Tipulidae           | 1                                  |             |
|                           |      | Ephemeroptera | Ephemerellidae      | <i>Attenella attenuata</i>         | 1           |
|                           |      |               |                     | <i>Ephemerella argo</i>            | 2           |
|                           |      |               |                     | Ephemerellidae                     | 1           |
|                           |      |               |                     | <i>Eurylophella bicolor</i>        | 1           |
|                           |      |               |                     | <i>Eurylophella donis</i> complex  | 1           |
|                           |      |               | Heptageniidae       | <i>Stenacron pallidum</i>          | 1           |



|  |  |                   |                  |                       |    |
|--|--|-------------------|------------------|-----------------------|----|
|  |  |                   |                  | Stenonema             | 10 |
|  |  |                   |                  | Stenonema modestum    | 27 |
|  |  |                   |                  | Stenonema terminatum  | 1  |
|  |  | Megaloptera       | Isonychiidae     | Isonychia             | 12 |
|  |  |                   | Corydalidae      | Corydalus cornutus    | 1  |
|  |  |                   | Coenagrionidae   | Argia                 | 1  |
|  |  | Plecoptera        | Chloroperlidae   | Chloroperlidae        | 2  |
|  |  |                   | Nemouridae       | Nemouridae            | 1  |
|  |  |                   | Perlodidae       | Isoperla              | 3  |
|  |  |                   |                  | Isoperla holochlora   | 4  |
|  |  |                   | Taeniopterygidae | Oemopteryx            | 3  |
|  |  | Trichoptera       | Hydropsychidae   | Cheumatopsyche        | 34 |
|  |  |                   |                  | Hydropsyche           | 1  |
|  |  |                   |                  | Hydropsychidae        | 3  |
|  |  |                   | Leptoceridae     | Oecetis avara         | 1  |
|  |  |                   |                  | Trienodes tardus      | 3  |
|  |  |                   |                  | Hydatophylax argus    | 1  |
|  |  |                   | Limnephiliidae   | Pycnopsyche           | 1  |
|  |  |                   |                  | Pycnopsyche guttifera | 1  |
|  |  |                   | Philopotamidae   | Chimarra              | 1  |
|  |  |                   | Psychomyiidae    | Lype diversa          | 2  |
|  |  |                   | Rhyacophiliidae  | Rhyacophila           | 1  |
|  |  | Class: Clitellata |                  | Oligochaeta           | 5  |



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